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# TENEMENT-HOUSE INSPECTOR

*SECOND EDITION, REVISED AND IMPROVED*

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*A TEXT BOOK FOR CIVIL SERVICE CANDIDATES FOR THE POSITIONS OF TENEMENT-HOUSE INSPECTOR AND CLERK*

—ALSO—

*FOR SANITARY AND BUILDING INSPECTORS INCLUDING ANSWERS TO ALL QUESTIONS GIVEN IN PREVIOUS EXAMINATIONS*

*WRITTEN FOR*

The Chief
JOURNAL OF THE CIVIL SERVICE

*BY*


GEORGE M. PRICE, M. D.

*AUTHOR OF "A HANDBOOK ON SANITATION:" AN EPITOME OF HYGIENE AND PUBLIC HEALTH, ETC.*

**Inspector N. Y. Sanitary Society for the 10th Ward, 1885**
**Inspector N. Y. State Tenement House Commission, 1894**
**Medical Sanitary Inspector, N. Y. Department of Health, 1895-1904**


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|| Hellman, Tenement.

# PREFACE TO SECOND EDITION.

The first edition of this book was published in the spring of 1904 and was exhausted in less than one year from date of publication.

In spite of the imperfections of the first edition, due to the haste with which it was composed, the book was acknowledged to have been a great help to the many thousands of candidates for the positions in the Tenement House Department, and the demand for a second edition was great, but could not be satisfied till now for lack of time.

The present edition of the book is entirely rewritten, contains many new features, and is better adapted to the need of students of tenement house conditions and inspection.

My experience of ten years in coaching students for sanitary positions has shown me that most students appreciate the study of the subject in the form of questions and answers, and I have therefore preceded the exposition of the subject matter by questions which are answered in the text. I have also given references to text books and other reading matter for such students as desire a more thorough further study on the subject.

A special feature of this edition is made of a complete set of answers to all questions given in former examinations, a feature which will be, I think, greatly appreciated by students.

The author hopes that this handbook may be useful also to others who are interested in tenement house conditions, to inspectors, owners and tenement house dwellers.

Brooklyn, September, 1910.
202 Marcy Avenue.

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THE
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NEW YORK

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# CHAPTER I.

## THE TENEMENT HOUSE PROBLEM, LAW AND DEPARTMENT.

### *QUESTIONS.*

1 How long is it since tenement house conditions began to demand attention?

2 What were the conditions to which attention had been drawn?

3 What was the opinion of the Committee of Hygiene as to conditions?

4 When was the first Board of Health established?

5 What Committees were appointed to investigate tenements?

6 What are the two most notable achievements of the tenement legislation of 1901?

7 What are the main features of the Tenement Law of 1901?

8 Why was it necessary to establish a separate Tenement Department?

9 How is the Tenement--House Department organized?

10 What are the rules of the Tenement-House Department?

11 What are the duties of Inspectors?

For further study of the subject the following books are recommended:

DeForest and Veiller. The Tenement-House Problem.
L. Veiller. Housing Reform.
Sykes. Public Health and Housing.
Nettlefold. Practical Housing.
Reports of the Tenement House Committee of 1894 and of 1901.

# CHAPTER I.

## THE TENEMENT HOUSE LAW AND DEPARTMENT. THE TENEMENT HOUSE PROBLEM.

It is over fifty years since tenement house conditions in New York have demanded the attention of philanthropists and legislators. In 1853 a committee of the Association for the Improving of the Conditions of the Poor made a report upon the sanitary conditions of the dwellings of the laboring classes in the city, in which report they drew the attention of the community to the following conditions: (1) The crowded conditions of the dwellings in which the poor are compelled to live; (2) The great density of population in certain districts; (3) The unsanitary conditions of the dwellings, and the consequent spread of disease and a high rate of mortality.

During the legislative session of 1856-7 a special commission was appointed to make a thorough examination and report upon the condition of "tenement-houses" in New York.

No definite results, however, were gained by the efforts of either of the above investigations, and the unsanitary conditions of the housing of the poor were growing worse and worse, until the next investigation by the Council of Hygiene and Public Health of the Citizens' Association of New York in 1864 have shown the "evils of the multiple domiciles or tenant-houses." I shall quote the following excerpt from their report: "The evils and the perils that surround the progress of the tenant-house system are the

necessary results of an absence of sanitary regulations and advice. That the evils and abuses of the system continue undiminished is seen on every hand. Not only does filth, overcrowding, lack of privacy and domesticity, lack of ventilation and lighting, and absence of supervision, and of sanitary regulation, still characterize the greater number of them, but they are built to a greater height in stories, there are more rear houses; the courts and alleys are more greedily encroached upon and narrowed into unventilated, unlighted, damp and 'well like' holes between the many storied front and rear houses; and more fever breeding wynds and cul-de-sac are created as the demand for the humble homes of the laboring classes increases."

The Metropolitan Board of Health, first established in 1866, as the result of the work of the Citizens' Association from its inception paid great attention to the improvement of tenement house conditions, by the promulgation of a sanitary code and establishment of regular supervision and inspection of tenement houses.

Since 1867, there were several commissions to investigate tenement house conditions, the most notable of the commissions being those of 1884, Dr. Felix Adler, chairman; 1894, R. V. Gilder; and of 1900, R. W. DeForest, chairman.

As a result of the efforts of these commissions and the agitation created by their reports, the laws of 1887, 1895 and of 1901 were enacted.

From its beginning tenement house legislation was progressive in its character, and all advance in the onward movement of such legislation has been gained in spite of the vigorous opposition of builders and owners, and in spite

of the ignorance and apathy of the tenement house population itself.

There are two most notable achievements of the progressive tenement house legislation of 1901. The first is the Tenement law, the second is the creation of a separate Tenement House Department. We shall here briefly examine the main feature of both these departments in housing legislation.

## THE MAIN FEATURES OF THE TENEMENT HOUSE LAW OF 1901.

These are as follows:

1. Increased protection against fire.

   a. By the provision prohibiting the erection of tenement houses over six stories in height unless they are fireproof throughout.

   b. By the mandatory construction of fireproof stairways in all new buildings.

   c. By the increase in the number and quality of the fire escapes in new as well as old houses.

   d. By the isolation of the cellars and lower part of the house from the rest of the house.

   e. By the prohibition of certain occupations and the keeping of combustible articles within tenement houses.

2. Better light and ventilation.

   a. Increased percentage of lot to be left unoccupied; larger yards, courts and areas.

   b. By the increased size of rooms, windows and of halls, etc.

c. By the abolition of dark rooms, dark hallways and narrow shafts.

d. By the compulsory artificial lighting of all public halls in the evening, and of two halls the whole night through.

3. Improved sanitary conditions.

a. The stringent provisions for the occupation of cellars and basements.

b. The prohibition of school sinks and other obsolete and unsanitary forms of plumbing fixtures.

c. The many other minor provisions improving sanitary conditions.

4. Improvement in the moral conditions of the tenement house population.

a. By the abolition of dark rooms and halls.

b. By the driving out of prostitution from tenement houses.

## THE ESTABLISHMENT OF A SEPARATE TENEMENT HOUSE DEPARTMENT.

But perhaps the most notable achievement of the legislation resulting from the efforts of the DeForest Commission is that which has resulted in the establishment of a separate department to supervise the construction, maintenance and inspection of tenement houses.

It was felt by those interested in the matter, that the number of tenement houses in the city being nearly 75 per cent. of all houses, and the number of the tenement house population being so great, it was absurd to concentrate all the power and supervision of such vast and paramountly

important interests in a sub-division of a bureau of a department which already occupied unlimited and ever-increasing fields of municipal activity. By the establishment of a separate department for tenement houses it was thought that a more proper supervision of the field and a better conformation to the law would be achieved.

## THE ORGANIZATION OF THE TENEMENT HOUSE DEPARTMENT.

The heads of the Tenement House Department are the Commissioner and his Deputy Commissioners.

There are three main bureaus in the department: The new building bureau, the bureau of records and the bureau of inspection.

The new building bureau has charge of the supervision of new buildings, from the approval of plans for projected buildings, through the inspection of the houses during and in process of construction to the final certifying that a completed tenement building may be occupied for the purpose it was built for. The charter demands for this bureau a force of not less than three plan examiners, and not less than sixteen light, ventilation and plumbing inspectors.

The bureau of record contains the records of every tenement house in the city, together with such records of disease, birth, death, accidents, etc., as are provided for in the law. The bureau employs a force of clerks according to its needs.

The bureau of inspection has charge (1) of the monthly house-to-house inspections to be made of every tenement

house, (2) of the investigation and report upon complaints received from citizens, etc., and (3) of the re-inspections of all orders of the department in regard to the improvement of these houses. The force of inspectors is prescribed by law as not less than 190.

The duties of inspectors are (1) to obey and follow the instructions and orders of their superiors, (2) to make such inspections and reports upon the inspections of such tenement houses as directed by their Chief, and (3) to supervise the sanitary conditions of the tenement houses in their districts.

The salary of inspectors is $1,200 per annum; the salary of clerks $1,050. The hours of work of clerks and inspectors are from 9 a. m. to 4 p. m., with one hour for lunch.

## RULES OF THE TENEMENT HOUSE DEPARTMENT.

*Official Hours.*—The official hours of the department are from 9 a. m. to 4 p. m., and on Saturdays, from 9 a. m. to 12 m. (Sundays and legal holidays excepted.)

*Politeness and General Conduct.*—All employees must conduct themselves in a quiet, civil and gentlemanly manner, and be polite and considerate in their intercourse with the public and with each other. Abuse, insolence or loud talking will not be tolerated. Kindly but firm and tactful treatment of the public is essential for the retention of an employee in the department.

*Other Occupations or Business.*—Employees of the Tenement House Department are forbidden to follow any other calling or occupation, or to be employed in any other business.

*Private Interests.*—While in the service of the Tenement House Department no employee shall make, use, or apply any portion of the time he may be required to devote to the service of the city otherwise than to the performance of his official duties, nor shall he use any information acquired in the performance of such duties, or any authority or power with which he may be vested as such employee for any purpose other than the performance of his public duties.

*Recommended Devices.*—No employee of this department shall indorse or recommend, or write letters indorsing or recommending any form of construction, mechanism or device.

*Access to Certain Parts of Department.*—No employee shall permit the public to have access to those portions of the department which the public is not permitted to enter.

*Work of Department Confidential.*—The public business transacted by the department, and the records thereof, must be treated as confidential by all employees. Talking outside of the department in regard to the rulings, business or transactions of the department is strictly forbidden. Information secured in the line of official duty must not be divulged to persons other than the officers of the department. All persons desiring information should be referred to the departmental offices.

*Official Badge.*—No inspector shall in any way cover up or conceal his badge or official hat band while on duty, and must, when required by any citizen, promptly and politely furnish his badge number and name.

*Improper Use of Official Badge.*—No inspector shall make use of his position, or of his official badge, for the pur-

pose of obtaining admission for himself or others to any place of amusement during the time of performance, or for obtaining tickets for same.

*Loaning Official Badge.*—No inspector shall loan his official badge to any person.

*Inspectors to Report Violations of Law.*—Inspectors are required to promptly report in writing all violations of law in regard to tenement houses called to their attention or which come under their observation. All reports made by inspectors must be from personal investigation and they must be personally acquainted with the facts in each case and not rely upon information given by others.

*Complaints.*—All complaints referred to inspectors must be examined and immediately reported on the forms provided for that purpose.

# CHAPTER II.

## BUILDING CONSTRUCTION.

### *QUESTIONS.*

1. Name the materials used in house construction.

2. Name the kinds of wood used for house construction.

3. What are the advantages and disadvantages of wood as a material?

4. What are the defects and diseases of wood?

5. How are they prevented and remedied?

6. Give essential points of floor, wall and roof construction.

7. Define following terms: girder, beam, post, joist, stud, sill, plate, girt, rafter, shingle, furring, lath.

8. What are brick, terra-cotta, tile, fire-brick? How manufactured?

9. What is lime? What are its characteristics?

10. What is lime-mortar? How manufactured?

11. What is cement? Natural? Portland? How manufactured?

12. What is cement-mortar?

13. What is concrete? How prepared? Various kinds?

14. Give brief description of the other building materials: such as asbestos, mineral wool, bitumen, pitch, tar, asphalt, builders' felt, etc.

15. What different iron is used in house construction?

16. What other metals are used?

17. What are the importance of the soil, site and aspect of a house?

18. How is a foundation prepared in an ordinary soil? In a rocky soil?

19. How are foundations prepared in water-logged soils?

20. How are footings and cellars constructed?

21. How are walls and floors constructed?

22. How are roofs constructed?

23. How are chimneys constructed?

24. What are the causes of smoky chimneys?

25. How are stairways constructed?

26. How are fire-escapes constructed?

27. What are the principles of fireproof construction?

28. What may be done to decrease dangers from fire in ordinary houses?

29. What are the causes of dampness in houses?

30. What are the causes of water in cellars?

31. How do we examine houses for dampness?

32. How do we trace sources of water in cellars?

33. How do we prevent house dampness and water in cellars?

34. What are the principles of damp-proofing construction?

35. Give rules of Tenement House Department as to water-proofing of cellars.

36. What are the objections to wall paper? To burlap?

37. What are the best sanitary ways of internal decorations of walls, etc.?

*References:*

Building Trades Pocketbook.
Building Materials. Byrne. J. Wiley & Sons.
Baker on Masonry and Construction. J. Wiley & Sons.
Price's "Handbook on Sanitation." J. Wiley & Sons.

# CHAPTER II.

## BUILDING CONSTRUCTION.

1. The materials which are used for house construction are the following: wood, brick, stone, lime, cement, concrete, iron and other metals, etc.

2. The woods which are most commonly employed in house construction are the pines (white, yellow, Georgia, etc.), ash, spruce, hemlock, oak, walnut and many others.

3. The advantages of wood for building material are that it is cheap, easily obtainable, readily worked and comparatively durable. The main disadvantage of wood is that it is highly inflammable and combustible.

4. The defects and diseases of wood making it unfit for house construction are as follows: too much moisture, knots, rind-galls, heart-shakes, twisted fibers, worm-eaten parts, dry rot, etc.

5. A proper selection of perfect lumber for construction would prevent the use of imperfect wood, while a proper previous seasoning (drying), either in the open air or in kilns, will prevent the settling and shrinking of wood due to its use while wet. The prevention of moisture and dampness in houses would prevent dry-rot, while a proper preservation of wood is possible by impregnation with certain chemicals, such as sublimate, copper sulphate, tar, creosote, etc.

6. *Floors* are made of the sill, girders and joists. *Walls* are made of the corner posts joined by the horizontal sill,

girt and plate, with the upright studs filling in the space between posts. *Roofs* are made of the angle rafters, resting on plate, and of the common rafters, which are covered with boards and then with shingles, or other roof material.

7. A *girder* is a principal horizontal beam. A *beam* is a horizontal piece of wood, iron or other material. A *post* is an upright piece of timber or other material. A *joist* is one of the horizontal timbers that support a floor, a ceiling, or both. A *stud* is one of the intermediate posts to which laths are nailed. A *sill* is a horizontal piece of wood, etc., at the bottom of a casing in a building. A *plate* is a horizontal timber laid on a wall to receive a framework. A *girt* is a horizontal timber in the middle of a wall to bind it. A *rafter* is a timber or beam giving slope to a roof. A *shingle* is a thin piece of wood (usually 18"x4"x½") at one end and tapering to less than an eighth of an inch at the other end, used like a tile or slate, to cover roofs or walls. *Furring* are strips of wood nailed to a solid wall on which to lath. *Lath,* thin strips of wood nailed to studs or beams to support a coat of plaster.

8. *Brick.* Brick is semi-vitrified moulded clay; the qualities of the brick depend upon the chemical composition of the clay and the method of preparation and manufacture of the brick.

The clay is dug out, cleaned and prepared; it is then put into special moulds, dried and burned in kilns. The color of the brick varies with the composition of the clay and manufacture of the brick. Some bricks are covered with enamel or with glaze, some also are artificially colored. Good brick is sound, free from flaws and cracks,

uniform in size, having sharp edges, gives a ringing sound on being struck with another brick, and in breakage shows a uniform compact structure, does not absorb more than one-tenth of its weight in water and should have a crushing strength not less than 5,000 lbs. to the square inch. For facing on outside walls a better quality is commonly used, while an inferior hollow brick is used for interiors. With brick, as with stones, it is necessary to wet them before laying, otherwise they will absorb too much water from the mortar and prevent proper setting.

*Fire brick* is used for lining stoves and wherever too high temperatures may be encountered; they are made of a special fireclay with a special chemical composition.

*Terra-cotta* is made of certain clays, mixed with sand and other materials, such as ground glass; is moulded, dried and baked in kilns. The moulds are made in different shapes. Terra-cotta is used in ornamentation on buildings, also for fire-proofing around steel columns. It is made in various colors and is sometimes hollow.

*Tiles* are manufactured of clays specially prepared and baked, is made of many various colors, shapes, sizes and qualities; is often used glazed, or enameled, and is used for roofing, floors, walls, and many other purposes.

9. *Common lime,* also called *quicklime,* or caustic lime, or fat rich lime, is a product of calcination of a nearly pure carbonate of lime. Lime has a great avidity for water and when brought in contact with it the lime absorbs nearly a quarter of its weight; during the process of absorption a great deal of heat is evolved, the lime falls in pieces and is finally reduced to a powder which increases greatly—from

two to three times—in volume over the original unslaked lime. On exposure to air lime hardens by absorbing carbonic acid and forming of carbonate of lime.

Slaked lime mixed with sand is used to make *lime-mortar*. *Poor,* or *meager limes,* are those which, beside the carbonate of lime, contain some impurities like the silicates, aluminates, etc. These limes slake less rapidly than the fat limes, evolve less heat, need less water, gain less in volume and are less suitable for mortar.

*Hydraulic lime* differs from common lime, in that the former hardens also under water, while the latter will harden but in air. This hardening under water is due to the crystallizing power of the hydraulic aluminates and silicate contained in the lime.

10. *Common lime mortar* is made of the mixture of a paste of common fat lime with sand. The strength of masonry construction depends much upon the quality of the mortar, and the quality of the mortar depends upon the proper mixing, proportions of the various ingredients, and the expert manufacture of the mortar. Common lime mortar hardens very slowly in interiors of walls and in thick masonry and wherever there is not abundant air; reliance must then be placed on cement.

11. *Cements.*—The oldest cement known in history is "pozzulana," made of volcanic dust found near Mount Vesuvius, and which was used by the Romans in a mixture with sand and rich slaked lime. This mortar was also used by the Romans for the manufacture of artificial stone. It is hydraulic.

*Portland Cement* is a comparatively modern invention,

and has but lately come into extensive use. Portland cement was first made by Joseph Aspdin, of Leeds, England, who patented his discovery in 1824 and called it "Portland," from its resemblance to certain limestones found in the Island of Portland. The manufacture of portland cement was taken up in earnest, in the beginning of the last half of the 19th century, and it was brought into the United States in 1865, was first manufactured here in 1872 and by the end of the century its production reached several million barrels a year.

At present the manufacture of Portland cement is an immense industry, and there are a large number of manufacturers, one firm alone producing over twelve millions of barrels a year. Portland cement is produced by subjecting a mixture of lime and clay to a calcinating process in special kilns and then reducing the product to a fine powder. The value of the cement depends upon the chemical composition of the ingredients, and the scientific methods of manufacturing. Portland cement is slow in setting, set under water, and attains an ultimate great strength.

*Natural cement* (formerly also called Rosendale, or New York cement) is made of the natural rock containing the right proportion of clay and carbonate of lime; the rock is broken, crushed, heated to a comparatively lower temperature than portland cement, and is then ground and pulverized.

Natural cement weighs less, sets quicker, is weaker, is lighter in color, and is in its final product more porous than Portland cement.

12. *Cement mortar.* To make cement mortar the cement

is mixed with sand and then mixed with water. The proportion of the cement and sand varies, but is commonly 1 to 3, 1 to 4, and 1 to 5; the more sand the weaker the mortar. The amount of water must be carefully proportioned, as upon the amount will depend the quickness of setting and the strength of the mortar. The water must be added gradually, and the quality of the water as well as the quality of the sand will affect the quality of the mortar.

13. *Concrete.* Concrete is an artificial stone made of mortar (lime or cement), mixed with an "aggregate" composed of broken stone, gravel, cinders, etc. The best concrete is made of Portland cement, clean, coarse sand and a mixture of broken granite, trap rock, or cleaned gravel. In this mixture the sand fills up all the voids between the stones, while the cement fills the voids between the particles of sand, which mixture when set composes an artificial stone of great adhesive power and crushing strength.

With the cheapening of cement and the improved methods in its manufacture, concrete has become the most important building material we have, and is extensively and universally used for a very wide range of objects from the manufacture of concrete blocks, construction of monolithin houses, to the making of sidewalks, and artificial stone figures.

*Reinforced concrete* is concrete in which during the process of setting bars and parts of metals are imbedded to add strength. Reinforced concrete is used for the construction of solid columns, beams and floors, and is extensively used in the construction of the immense steel skeleton skyscrapers.

*Monolithic concrete* construction has lately been widely introduced for domestic architecture. It is made by pouring fresh concrete into specially constructed forms of wood, or iron, which are removed when the concrete hardens and presents a solid body. Walls, foundations, footings, and whole houses have been made of monolithic concrete.

There is no doubt that in concrete we have a most valuable building material, which may become the ideal material for house construction. The two principal objections to concrete is the expense, and the fact that concrete is not water proof. With wider use and improved methods of manufacture the cost of concrete is bound to come down, while water proofing methods applied to concrete will make it unobjectionable because of its porosity.

14. Among the other building materials which should be mentioned are the following: Asphalt, pitch, gypsum, the metals, asbestos, mineral wood.

*Asphalt.* Asphalt, or bitumen, is a natural mineral substance, composed of various hydrocarbons, and is found widely all throughout the world in several forms, in large deposits, especially in the lakes on the Island of Trinidad, and in Bermuda and Venezuela.

*Pitch,* or coal tar, is an artificial product of the distillation of coal gas, or of certain resinous woods.

*Asphalt* is one of the oldest materials used for water proofing. It is mentioned in the Bible as having been used by Noah to damp-proof his ark; the basket in which Moses was put into water was "bituminated," asphalt was used on the tower of Babel; it was an ingredient of the walls of Nineveh and of the Pyramids, and has been very much used in

ancient, medieval and modern times. It is still used for the same purpose and with the same aim, namely, as a water-proofing compound, to prevent moisture from gaining access to porous materials; and it is so far the best water proofing medium we possess. Asphalt is also used in preparation of water-proof asphalt cement.

*Gypsum,* or plaster of paris, is sulphate of lime with water. On being calcinated it forms a dry, white powder, the commercial plaster of paris, which for use is mixed with water forming a paste which hardens on exposure to air and is used for internal decoration, plastering, cementing and manufacturing of small objects.

*Asbestos,* or "earth flax," a white-gray mineral which is incombustible, being unaffected by very high temperatures up to 5000°F, and is therefore used for fire-proofing various materials.

*Mineral wool* is a fibrous wool made from blast furnace slag, and is in the form of very thin, minute threads, very light, and is fire-proof, a bad conductor of heat, and is used for filling in spaces between walls and floors, as it is also sound-proof and is incombustible. In the presence of moisture mineral wool is liable to decomposition.

15. Iron, cast, wrought, galvanized and steel, are extensively used for walls, floors, beams, girders, also for manufacturing of plumbing pipes and house hardware.

16. Copper is used for roofs, metal gutters, boilers, etc.

Brass, bronze for hardware and ornaments, also gas fixtures.

Tin and zinc for roofing and many other purposes.

Lead enters into the manufacturing of pipes, for roofs, flashings and many other purposes.

17. The *aspect* of the house, or its relation to the sun and wind, is very important, because it determines the dryness and insolation of the house.

The *soil* and the *site* of the house are very important to the dwellers of the house, as the dryness and salubrity of the house depend much upon the kind of soil the house stands upon and the character of the site of the house.

18. When the soil consists of rock, clay, or firm earth, the preparation is not very difficult. An excavation is made to a certain depth, determined by the character of the soil and of the house to be erected thereon, all the loose soil is removed, the excavation made several feet wider and longer than the space which the proposed house is to occupy, and the foundation bed is ready for further treatment. When the soil is of rock it may be necessary to blast the rock so as to have the bed at a certain level, or the rock may be simply leveled and planed off.

The treatment next in order is to spread upon the excavated bed some material which is solid, impermeable and strong to support the house superstructure. The best material used in modern construction for this purpose is concrete, which is spread to a depth of six to twelve and more inches and finished off on top with cement. This solid and hard substratum of cement and concrete is, however, not absolutely water-proof, as concrete is porous and will let water through, especially coming with a pressure, as ground water is sometimes known to exert. In order therefore to make the foundation bed water-proof it is rec-

ommended to lay above the bed of rough concrete a course of water proofing which consists of several layers of tarred felt, laid in hot, heavy coal tar pitch, or liquid asphalt, finished with a flow of hot pitch of the same character. The felt is so laid that each layer overlaps by two-thirds of its width the layer immediately below, the contact surface being thoroughly coated with hot pitch over its entire area before placing the upper layer.

Such a water proofing of foundation beds is necessary to insure the dryness of the house and the dampness prevention of being drawn in by capillary attraction from the subsoil.

19. Where the soil is not firm and is artificial and consists of quick-sand, is water logged, or is entirely under water, the preparation of the foundation bed is more difficult, and is accomplished by several methods known as "coffer-dam," "caisson" and "pile" foundations, although there are several other methods, like freezing, grillage, cribbing, etc., into the intricacies of which we cannot enter here.

In *coffer-dam foundations* the space to be used for foundation is inclosed by board or sheet piles driven into the soil. In *caisson foundations* iron, or wood boxes are sunk by gravity or by means of compressed air, the loose earth removed and the gained space filled in and treated with concrete as with ordinary foundation beds.

In *pile foundation* the bed is prepared upon the tops of wood or iron piles which are driven in by drop or steam hammers into the water-logged soil to a certain depth, the tops leveled off and used as bed for the concrete foundation.

20. *Footings.* Once the foundation bed is prepared, the

builder is ready for the construction of the walls which rests upon footings. These footings or base courses of the wall are constructed of stone, or concrete, of thickness somewhat greater than the walls and of a strength sufficient to bear the weights to be superimposed upon them.

The New York Building Code requires that concrete footings be not less than twelve inches thick. The bearing capacity of footings must be properly calculated.

21. The value of the walls depends upon the material, workmanship, and thickness. Whatever the material used for the walls, there are in modern construction three principal forms of wall construction: frame, masonry and steel construction. In frame construction, the principal security of the wall rests upon the timber posts, sills and plate. In masonry construction the walls are constructed of stone, natural, or artificial, or of brick, or of concrete blocks, etc., the security of the wall depending upon the strength of the material and thickness in which they are laid, as well as upon the quality of the mortar with which they are bound.

In steel skeleton construction the security of the wall depends upon the steel frame and its proper riveting. In stone constructions the walls are necessarily very thick, which takes much of the building space. In brick construction the thickness depends much upon the height of the wall and the character of the building.

*Floors* are ordinarily constructed of boards nailed upon the joists. The boards are of white pine, spruce, sometimes of harder lumber. In cheap work the boards are made single, and nailed to joists; in better work the floor is double,

first wide boards being nailed diagonally upon the joists, and then narrow strips, tongued and grooved being fixed on top. Naturally the chances for shrinking and formation of cracks and crevices are less with double floors. Solid floors are preferable to the above described floors, and may be made by the joists laid side by side, the upper flooring being nailed to joists, while the undersurface is lathed directly upon the joists.

Steel joists with concrete filling, or terra-cotta covered, and the modern reinforced concrete beams and terra-cotta floor construction is of course the better sanitary construction of floors. Mineral wool filling is commendable in its fire-proof quality, although there is some danger of its being decomposed by moisture. The floors of basements and cellars should never be made of wood and, for fire prevention, and especially for damp-proofing purposes, should invariably be made of concrete and cement, with proper provisions for damp-proofing, by using some water-proofing compound.

22. Roofs are constructed from certain water-proof materials which are laid upon the boards which are fastened upon the rafters. Roofs must be rain and fire proof, and should be bad conductors of heat, sound and dust. The materials used for roof coverings vary from straw, thatch, wood-shingles, to tile, slate, metal, tarred felt, asbestos, etc. The first three are very inflammable and are not good materials to be used.

23. Chimneys are ducts for the passage of smoke and gases from fireplaces and stoves. They are usually made of brick, and, as there are a number of individual fireplaces

and stoves in the ordinary house, the chimneys consist of a number of separate ducts, as it is indispensable for every fireplace to have its own separate and individual flue leading outside. The chimneys are built in one side of wall and inclose the several flues which are made of metal or are lined with fire-brick, and which should be of a diameter at least 8", hectagonal or circular. The top of chimney is constructed above the roof for several feet so as to be above all copings, and must be protected by slate or stone ledges on sides to prevent rain to come into the chimney wall.

24. The following are some of the causes of smoky chimneys:

1. A too wide or too narrow diameter of the shafts. A shaft which is too wide lets the smoke go up only in a part of its diameter, and when the smoke meets a counter current of cold air it is liable to be forced back into the rooms.

2. The throat of the chimney may be too wide and will hold cold air, preventing the warming of the air in the chimneys and the consequent updraft.

3. The cowls may be too low or too tight, preventing the escape of the smoke.

4. The brickwork of the chimney may be loose, badly constructed or broken into by nails, etc., thus allowing smoke to escape therefrom.

5. The supply of air may be deficient, as when all doors and windows are tightly closed.

6. The chimney may be obstructed by soot or some foreign material.

7. The wind above the house may be so strong that its pressure will cause the smoke from the chimney to be forced back.

8. If two chimneys rise together from the same house and one is shorter than the other the draft of the longer chimney may cause an inversion of the current of air in the lower chimney.

9. Wet fuel, when used, will cause smoke by its incomplete combustion.

10. A chimney without a fire may aspirate the smoke from a neighboring chimney; or, if two fireplaces in different rooms are connected with the same chimney, the smoke from one room may be drawn into the other. "Handbook on Sanitation." G. M. Price, M.D.

25. Stairways are constructed within the stair well of house and are made of the two side "stringers" which are jointed by steps or *treads,* between which there is space, called a *rise,* filled in by the "risers." The stairs are also provided with handrails, ballusters and newels.

26. Fire-escapes consist of the balconies and the stairways connecting them. The balconies consist of a platform with an opening in one part of same, said platform consisting of longitudinal slats reinforced by cross battens supported upon brackets, and the balcony consisting also of the bottom rail, the top rail with the standards between the top and bottom rails. The stairways consist of the side stringers with the cross treads, also supplied with hand rails. From the first balcony to the ground or sidewalk there is provided a "drop ladder," while the "goose-neck" ladder is

provided for the escape from the top floor balcony to the roof.

27 and 28. There are three methods of reducing the dangers from fires; the use of fire-proof materials, fire-proof construction and fire-escape and fire-extinguishing appliances. The most commonly used fire-resisting materials are iron, stone, concrete, fire-proof terra-cotta, asbestos, etc. Fire-proof construction consists in the elimination of wood, continuous air-wells, shafts and other communications between the various floors; the lining of all absolutely needed shafts, such as dumb-waiter, elevator, etc., with fire-proof materials and providing them with self-closing doors; the construction of floor and partitions of reinforced concrete, or of metal columns protected by burnt terra-cotta; the use of mineral wool for filling in hollow spaces, etc., etc.

29. *House Dampness.*—Dampness in houses may be due to conditions outside the house, or to conditions within the house itself; also to conditions above and below the cellar.

The following are the principal causes of house-dampness above the cellar: 1. *The porousity of the various building materials.* Building materials, such as stone, brick, wood and mortar are all very porous and each of these materials is capable of absorbing large quantities of water; thus brick absorbs from 10 to 20 per cent. of water, wood from 10 to 40 per cent., stone from 5 to 20 per cent., and mortar from 20 to 50 per cent. of water. All these quantities of water remain within the walls during and after construction, and if the house is not properly dried before occupation, will cause dampness of walls.

2. *The water from various sources* coming in contact

with the roof and walls. This water may come from the rain, etc., falling upon uncompleted houses during construction; or it may be incorporated in the house from the wetting of the bricks and the water in the mortar during construction; or it may come from the rain, etc., falling upon the walls after the house has been built.

3. *Certain defects in the construction of roofs or walls,* or defects in these after construction due to lack of repair, etc., may let in the water from storms and rains into walls of the house, rendering them damp.

4. *Occupation.* The legitimate use as well as abuse of water in houses may let water come in contact with walls, ceilings and floor and cause these to become damp.

5. *Capillary attraction from the ground,* either adjoining the house, or that below the foundation; also from water which may have gained entrance into the cellars.

30. *Water in Cellars.*—The following is a classification of the various sources of water in cellars. (A detailed explanation of each source cannot be given here):

I.—NATURAL SOURCES.

*Surface Water.*—Location of house.
Proximity of adjoining ground.
Condition of surrounding ground.

*Sub-soil Water.*—Ground water.
Underground lakes, streams and ponds.
Underground springs and wells.

*Tide Water.*— Coming through ground.
Coming through sewer pipes.

## II.—ARTIFICIAL SOURCES.

*Water Service Leaks.*—Street mains.
House mains. Yard and dead pipes.
*Sewage Water.*—Permeability of sewers.
Street and private sewers.
House and yard drains.
Cesspools, privies, etc.
*Storage, Etc.*— Storage of ice, etc.
Manufacture of mineral waters, etc.
Overflow from various fixtures.

31. Houses are examined for dampness by inspection of the possible defects in plumbing, etc., and by the evidence of dampness in walls and ceilings, such as spots, dry-rot, mildewing, etc., also by the weighing of samples from the masonry and determining the exact amount of water therein.

32. The sources of water in cellars may be traced by the examination of the surroundings and all parts of the house to detect any possible defect and source of the water, by the chemical examination of the water in cellars to determine its nature; and a color test being put into any suspected fixture to determine if it is not the cause of the water by the color appearing in the cellar water.

33. House dampness is prevented by the following means:

1. Selection of dry and well-drained sites.
2. The use of dry, well-seasoned building materials.
3. Thorough drying of newly-built houses before occupation.

4. Careful use of water and steam within house.

5. Prevention of water in cellars.

6. Damp-proof methods of house construction.

34. The principles of water-proof house construction are as follows:

1. Dry, well-seasoned building materials.

2. Complete isolation of house from ground by damp-proof courses, as described below.

3. Surface coating of walls and roofs by metals, slate, tile, liquid bitumen compounds, water-proof paints, tile and glazed brick, paints and varnishes, and by Silvester's method, consisting in coating masonry walls first with solution of soap and then with solution of alum.

35. The following are the instructions of the Tenement House Department to builders and owners as regards construction of foundations and cellars:

There shall be built with the foundation walls, at level of six (6) inches below the finished floor-level, a course of damp-proofing consisting of not less than two (2) ply of tarred felt (no less than fifteen (15) pounds weight per one hundred (100) square feet), and one (1) ply of burlap, laid in alternate layers, having the burlap placed between the felt, and all laid in hot heavy coal-tar pitch, or liquid asphalt, and projecting six (6) inches inside and six (6) inches outside of the walls.

There shall be constructed on the outside surface of the walls a water-proofing lapping on to the damp-proof course in the foundation walls and extending up to the soil level. This water-proofing shall consist of not less than two (2) ply of tarred felt (of weight specified above), laid

in hot heavy coal-tar pitch, or liquid asphalt, finished with a flow of hot pitch of the same character. This water-proofing to be well stuck to the damp course in the foundation walls. The layers of felt must break joints.

*Cellars.*—There shall be laid, above a suitable bed of rough concrete, a course of water-proofing consisting of not less than three (3) ply of tarred felt (not less than fifteen (15) pounds weight per one hundred (100) square feet), laid in hot heavy coal-tar pitch, or liquid asphalt, finished with a flow of hot pitch of the same character. The felt is to be laid so that each layer laps two-thirds of its width over the layer immediately below, the contact surface being thoroughly coated with the hot pitch over its entire area before placing the upper layer. The water-proofing course must be properly lapped on and secured to the damp course in the foundation walls.

36. The objections to wall papers as coating for inner walls and ceilings are the following:

1. Many wall papers contain arsenic and lead in their colors, which rub off in form of dust and dangerous to health.

2. Papers on walls absorb moisture, cannot be washed, the dust and dirt adheres to them.

3. Papers are fastened to walls with flour and similar pastes which decompose, sour and become a nest of insects and germs.

Burlap, unless it is smooth and painted over, is objectionable for the same reasons as wall paper, especially when it has a rough surface.

37. The best covering of walls and ceilings is paint and

varnish or the newer "sanitary" smooth coating on walls, which may be readily cleaned and washed.

# CHAPTER III.

## VENTILATION, ILLUMINATION AND HEATING.

### *QUESTIONS.*

1. State the composition of atmospheric air.
2. What is the relative importance of each component?
3. What are the common impurities in air?
4. What are the sources of impurities?
5. Describe their character and importance.
6. What is the quantity of air needed?
7. What is ventilation?
8. What are the properties of air?
9. What are the agents of ventilation?
10. What are the methods of ventilation?
11. What are the common means of natural and artificial ventilation?
12. Upon what does the purity of air depend: size of room or ventilation?
13. What are the improved devices for ventilating rooms and houses?
14. What are the essentials of mechanical ventilation?
15. What is the relation of ventilation to light and heating?
16. What is the relation of sunlight to health?
17. What are the fundamental laws of light?
18. Give essential principles of window construction.

19. Name the artificial illuminants and their advantages and disadvantages.

20. Give essentials of illuminating gas lighting.

21. Give essentials of electric wiring of houses.

22. What should be the temperature of rooms?

23. What are the methods of heating?

24. Give examples of each and state their advantages and disadvantages.

25. Give essential points and advantages of hot air heating.

26. Give essentials of hot water heating and its advantages.

27. Give essentials and advantages of steam heating.

# CHAPTER III.

## VENTILATION, ILLUMINATION AND HEATING.

### I.—VENTILATION.

1. The atmospheric air surrounding the earth is quite uniform in its composition. It contains oxygen 20.94, nitrogen 78.09, argon 0.94, carbon dioxide 0.03, with traces of helium, kryton, neon, xenon and hydrogen.

2. The most important of the air constituents is O, which is indispensable to combustion and respiration. The function of N, besides that of a diluent, seems to be to support certain forms of plant life; the use of argon is unknown; $CO_2$ is necessary to vegetable life.

3. Besides the above components, air contains a larger or smaller percentage of moisture, and, near the earth surface, it contains particles of dust and other impurities.

In densely populated towns the composition of air varies somewhat from the above, in that the $CO_2$ may reach 0.04, or even 0.05 per cent., the amount of O may be reduced to 20.87, while the number and quantities of various impurities are very large, consisting as they do of the detritus of inorganic and organic life and products of combustion.

4. The impurities within house which may be mixed with air come from the following sources:

1. Respiration of persons.
2. Illumination and heating.
3. Accidental sources.

The expired air from persons differs in its composition from ordinary air by a decrease of O (4 per cent.), increase of $CO_2$ (3.5 per cent.) and an excess of about 5 per cent. of aqueous vapor. There is also an increase in the temperature of air, addition of some volatile matter, and occasionally some bacteria lodging in nose, mouth and throat may be dislodged and added to the air.

Artificial illumination and combustion decrease the amount of O, increase the amount of $CO_2$, raise temperature, add to the amount of aqueous vapor and may also add products of faulty combustion CO, sulphur and ammonia compounds, etc.

Particles of inorganic and organic detritus, dust, etc., may also be added to the air from accidental causes such as walls and surfaces of house, processes carried on within same, etc.

5. The relation of the above impurities and their contents in the air of rooms to health is of the utmost importance.

While the increase of the percentage of aqueous vapor and the temperature of the room air may become of importance to health, the main danger to health of room air consists in the increase of $CO_2$, respirable impurities and dust, deleterious gases and basteria.

The increase of $CO_2$ becomes of importance only when it reaches the infrequent amount of 4 per cent., provided this increase in the volume of $CO_2$ is at the expense of O; at 18 per cent. of $CO_2$ in the composition of air with a corresponding reduction in volume of O, death may follow

rapidly. An extreme increase of $CO_2$ without a corresponding decrease in amount of O is seldom taking place.

6. The amount of pure air which is needed to add in a room for each average person has been estimated as 3,000 cubic feet, hence a hermetically closed room of 3,000 cubic feet capacity, inhabited by one average person will need an hourly change of air, while a smaller room will require a correspondingly more frequent change.

7. In rooms shut off from the external air, it is evident that with a number of persons present and with illumination, combustion and other processes being carried on, the added impurities in the air may reach soon such an amount that breathing may become difficult or dangerous on account of the added impurities. Unless, therefore, there is an influx of fresh air from the outside and removal of the impure air, the room air may become dangerous to health and life.

Such an exchange of air, the removal of inside impure air and its substitution by fresh pure outside air is called *ventilation.*

8. The properties of air are: diffusion, motion and specific gravity. By diffusion is meant the property of air which is common to all gases, i. e., that of diffusing itself through space. The motion of the air is due partly to its diffusibility and partly to the variation in the specific gravity of the air due to the differences in temperature, which differences cause the warmer air to be lighter while the colder air is heavier and thus an exchange of air is produced, due to the differences in weight of various columns of air.

9. These properties of air act also as agents of ventilation, for by the action of diffusion some air is gotten through the

porous walls, etc., into the house, while by the action of winds aspiration and perflation of air are accomplished from rooms. Most of the ventilation in houses is done through the agency of the difference in the temperature of rooms inside the house from the temperature outside, such differences accomplishing an exchange of air between the inside and outside of house according to the amount of difference in the temperatures.

10. The exchange of air within the house, ventilation, is carried on, in ordinary houses, spontaneously through the natural diffusion of the air through the porous walls and building materials of the house, or the openings, cracks, crevices, etc., usually found in commonly constructed houses. This is called *natural ventilation.*

The natural exchange of air may be facilitated by making artificial openings in the house in the form of windows, transoms, skylights, or special openings in various places within the house.

There is also a form of ventilation which is accomplished by a forced drawing out of the air from the house, or by a forced introduction of outside air into house by mechanical means. This is called *mechanical ventilation.*

Not much dependence may be placed upon spontaneous natural ventilation carried on through the porous building materials and accidental openings. With a great difference in the temperature of external and internal air there may be a greater amount of exchanged air, but this is lessened by a more tight construction of the house, and by the modern methods of painting and water-proofing of house.

11. The principal means of ventilation in most houses

are through the windows, doors and the artificial openings specially made for the purpose.

The occasional opening of doors and the opening of windows greatly assist the exchange of air in ordinary dwellings with not too many persons in the rooms and with but ordinary illumination and heating.

When the number of persons in rooms is large and the number of lights increased, the windows and doors may not be sufficient for adequate ventilation, and special openings artificially made may be needed.

The number and character of such openings vary in size, location, shape, character, etc.

The openings may be in the shape of tubes or boxes placed within the windows, the sashes, the panes, the walls at different points, the ceilings, or the floors. All such openings communicate with the external air, and serve as air inlets, or outlets, and may also be provided with adjustable doors so that they may be closed up when not wanted.

The number of ventilating devices is very large, but their value depends upon their location and size.

Where local heating is used within the house, ventilation is aided by the necessary chimney and flue openings, and by the use of the grates and stoves.

12. The purity of the air in a room depends upon the amount of air entering it and not upon the size of the room. A large room, if not ventilated, becomes dangerous to health when its air is deteriorated, while a small room, if the exchange of air is thorough and adequate, will be always comfortable and healthy.

13. Several methods have been suggested to improve the ventilation of rooms in tenement houses without adding too much expense, or necessitating any extraordinary plants and contrivances. The following are some of the methods by which the ventilation of rooms can be improved:

(a) Raise the lower sash of the window about 6 inches, and put into the open space a snugly fitting block of wood. By this means a space is made between the lower and upper window sashes through which air can come in without causing a draught.

(b) Another useful contrivance is the removal of circular or other parts in the panes and replacing them by perforated zinc and by tubes through which air can come in.

(c) Metal circular elbows are sometimes fitted into the lower or upper sash with one part of the elbow pointed upward so to allow entrance of air upward.

(d) The natural heating of chimneys by the combustion in stoves, etc., or the placing of gas jets within the chimneys to warm the air are good methods of improving the ventilation of rooms, as the air in the chimney being warmed tends to escape upward and thus be replaced by other air in the room.

(e) To improve the ventilation of stair halls the law calls for louvered and ridge ventilators in the skylights over the stair wells.

14. *Mechanical Ventilation.*—The advantages of mechanical ventilation are the constancy of the exchange of air, the independence of any other means, the perfect control of the velocity and volume of the supplied air, the possibility

to accurately regulate the temperature, quantity, moisture and purity of incoming air.

Mechanical air is, as a rule, carried on from a central plant, and is of three kinds: plenum, or propulsion method, in which pure air is driven into house from outside; vacuum, or exhaustion methods, in which the impure air is withdrawn from the house and the combined methods.

Mechanical ventilation requires motors (steam, water or electricity) to operate the propulsion or exhaust fans, etc.; central ducts and tubes which radiate throughout the building either within or outside of walls, floors, etc.; and the inlet and outlet boxes or openings within the room.

Incoming air may be moistened, cooled or warmed and filtered in the central tubes, its velocity may be measured by anemometers, the temperature regulated by thermostats, and humidity controlled by humidostats.

15. The relation of ventilation to heating is very close, as much of the ventilation of rooms depends directly upon the temperature of the room, and the difference of the room temperature from that outside of house; the greater the difference the greater the exchange of air between the outside and inside of house. Besides, heating directly helps ventilation by the means of the fireplaces and chimneys, which act as ventilating shafts.

Sunlight helps ventilation by partly purifying and disinfecting the air, while artificial light deteriorates the air in rooms by producing a large number of impurities.

## II.—ILLUMINATION.

16. Sunlight is essential to life; it is indispensable for the

life of everything in the vegetable and animal kingdom. Sunlight is known to be a powerful germicide and disinfectant; it kills low organisms, fungi and moulds; it destroys tubercle bacilli and other microbes which are enemies to the human race. Without sunlight our houses are damp, cold, dark and dirty; without sunlight ill health, anemia, loss of bodily resistance, defective vision and many other ills result.

17. There are several physical laws of light which it is necessary to understand in order to intelligently discuss the natural lighting of houses. When the rays of light fall upon the surface of a body, the result will differ according to the character of the surfaces of the body. The rays of light may be absorbed if the surface is of a dark color; or they may be transmitted through the body if it is transparent; or the rays may be reflected.

The intensity of light varies as the illuminating power of its source, also inversely as the square of the distance from the point to the source; it also diminishes as the inclination of the surface to the rays of light increases. The relative illuminating power of different sources of light is measured by photometers, and a standard unit of illuminating power is a sperm candle, weighing one-sixth of a pound, and burning at the rate of 120 grains per hour.

This is called the standard candle, and we speak of the *candle power* of any light as the number of standard candles needed to produce the same illuminating power as the light in question.

18. The following are the principles of window construction:

(a) At least one-tenth of the superficial area of a room should be used for windows.

(b) One square foot of glass should be allowed to every 70 cubic feet of interior space to be lighted.

(c) The height of the window should be twice its width.

(d) The light should come from the rear and left side.

(e) The windows should be set with as little space between them as possible.

(f) The piers between the windows should be as narrow as possible and should be beveled instead of rectangular.

(g) There is no need of constructing windows in deep recesses; they should be built flush with external wall.

(h) The windows should extend to the ceiling as near as possible to catch all light from the skyline.

(i) There is no need for any wall space between the trim of the window and the ceiling.

(j) The top of window should come within 6 inches from the ceiling.

(k) It is best not to have windows arched at top.

(l) Windows may reach the floor in casement windows; and considerable light may be obtained from floors colored white.

(m) In sash windows the sill of the lower sash may be two or three feet from floor.

(n) The fewer opaque bars in the windows the better, one pane is better than two, and two are to be preferred to four; the bars exclude light and produce unnecessary shadows; they should be as narrow as possible, of metal rather than of wood.

(o) The meeting rail of sash windows should be

placed at the height of 5 feet 8 inches from the ground, so as not to be on a level with the eyes of the individual of average height.

19. Artificial illumination in the house is obtained by the raising of certain substances containing carbon to a degree of incandescence. Artificial illumination is obtained from electricity, or from oils, alcohols, water-coal and acetylene gases.

The value of artificial illumination is judged by the following characteristics: intensity, quality, heat production, amount of impurities, safety and cost.

Electric light may be very intense, but ordinary incandescent bulbs are of 16 to 32 candle power, while the newly introduced Tungsten lights give a brilliant light.

Acetylene gas may give a very intense and brilliant light of from 20 C. P. to 160, while the intensity of other lights depends upon their material, character of burners, etc.; the so-called "Welsbach" lights, made of mantles impregnated with earthy silicates which become incandescent upon slight heating, giving from 60 to 120 C. P. lights.

All artificial illuminants except electricity produce considerable heat, and are capable of raising temperature of room. All artificial illuminants produce considerable aqueous vapor, sufficient to considerably raise the relative humidity of a room.

All illuminants, except electricity, give off some impurities, such as CO, $CO_2$, sulphur compounds, ammonia compounds, smoke, soot and moisture.

*Acetylene Gas* ($C_2H_2$), is produced by mixing water with calcium carbide, during which process much heat is

evolved. Special generators are manufactured for the production of the gas, and, contrary to the current opinion, there is little danger from explosions, as calcium carbide is not explosive neither by heat nor by concussion. The pipes used for ordinary gas illumination may be used also for acetylene lights, except that the tips of the burners must be smaller. The light is intense, steady, white and cheap, and is very appropriate for houses in rural communities, or wherever there are no central plants.

20. *Coal gas* is made by heating bituminous coal in air-tight vessels, during which process the combination of hydrogen and carbon is transformed into other gaseous and solid compounds. The refined product contains about 50 per cent. of hydrogen, 35 per cent. of marsh gas, 6 per cent. of CO and of some residue.

*Water Gas* is manufactured from anthracite coal, steam and petroleum, by a complicated process, the refined product containing 30 per cent. of CO, 35 per cent. hydrogen, 20 per cent. marsh gas and some residue.

Because of the increased amount of CO, water gas is more dangerous to life and health than coal gas. The inhalation of even small amounts of water gas is injurious, while large amounts may become fatal by the carbon monoxide combining with the hemoglobin of the blood and forming an insoluble compound.

Coal and water gas are manufactured in central plants, from which they are conducted through iron tubes and pipes under streets into the houses, and through a network of smaller iron pipes throughout the house. The gas service pipes are made of best wrought iron with malleable

iron fitttings, and the service house should be provided with main and secondary stop cocks and meters to measure amounts of gas consumed.

The gas service system must be perfectly gas tight, should be exposed and readily accessible and should be tested for air tightness by appropriate tests before use and periodically during use.

Fixtures of gas are of various shapes and value. The intensity of illumination greatly depends upon the character of burner, Argand and Welsbach burners being the best.

A too great intensity is controlled by glass shades and globes.

21. Electric light is commonly derived from power furnished by central stations, as the installation of dynamos in private houses is quite expensive. The cost of electric power, especially in large towns, is being reduced to a figure which makes the cost of illumination by electricity not much more expensive than illumination by coal or water gas. The electric current to supply the house is conveyed through two copper wires (a positive and negative), which wires must be properly insulated by being covered with vulcanized rubber. The insulated wires are encased, when running throughout the house, in either wooden casings (or mouldings), or in special insulated hollow looms, or, in more expensive work, in steel conduits which are made flexible. When the wires are to be run within walls or under floors looms or conduits must be used exclusively, while mouldings may be used whenever the wires are run upon walls or ceilings. Care must be taken to prevent the wires from being tampered with, or from nails being driven into them,

as that will cause short circuiting and may cause fire. Whenever wires run through thickness of walls they must be within porcelain tubes.

Protective fuses should be installed upon all circuits, and no wire should carry more current than it is supposed to do. Fuses consist of protected caps with a piece of lead or tin wire, which melts and stops the current as soon as a stronger current is sent through the wires than that which they may carry. The fuses should be put and installed in special boxes and covered, and not be placed in any closets where paper or rubbish is put away.

Special meters to measure the current are provided by the companies supplying the power.

Switches to turn on the lights are usually provided in numerous places so as to facilitate the turning on and off the current. Pendant switches may be provided on the fittings. Where the house wires are joined to the fixture wires they must be soldered and insulated.

Fixtures for electric lights are made in innumerable designs, with the wires running within tubes. Often the fixtures are designed for both electricity and illuminating gas.

Switches may be so constructed that lights are turned on by the opening and shutting of doors; this is of convenience for automatic lighting of closets, pantries, water closet, apartments, etc. The lamps used for domestic lighting are the Edison incandescent of 8, 16 and 32 candle power. These lamps have a life of from 500 to 1,000 hours. Higher efficiency lamps have been lately introduced, and constant improvement is to be expected in the near future.

The installation of the electricity in buildings, the wiring and fixtures are commonly under the supervision of municipal departments, as well as of the Board of Underwriters.

## III.—HEATING.

22. The proper temperature of rooms must necessarily vary according to many factors, such like season of year, character of houses, strength and physical condition of individuals, habits of various persons, activity, etc., etc.; but allowing for all the differences due to various factors, it may safely be assumed that the maximum variations of temperature of rooms in houses for the average house dwellers should be in winter between 58°F-70°F, and in summer between 65-75°F, with a relative humidity of 40-50 per cent. in winter and 50-60 per cent. in summer.

It is obvious that the temperature of various rooms may vary; thus a work room may be lower in temperature than a sick room, a bed room lower than a living room, etc.

23. There are three methods of heating: the radiant, the conductive and the convective, according as to whether the heat is given off in direct rays from the combustible materials, as in grates, or whether it is conducted through some intermediate material, like iron, tile, etc. (stoves), or whether it is conveyed by means of air, water or steam.

24. Local heating is accomplished by means of grates and stoves. Grates are the oldest form of heating houses, and are made of iron open receptacles in which the fuel is placed, which on combustion gives off direct rays to the

surrounding air and objects, while the waste products are carried off through the chimney. It is a very wasteful method of heating, as 75 per cent. of the fuel is not utilized and is lost, the heat is not equally distributed, it produces draughts and strong currents, and cannot adequately warm large rooms all over equally. Grate stoves greatly assist ventilation. The Galton form of grate is an improvement over the ordinary grates, in that the cold air from the outside is drawn behind into the grate, where it is warmed and returned to the room over a special opening.

Stoves are made of iron, tile, brick, etc., and a larger percentage of the fuel is utilized through them, as their heat is not only radiant, but is conducted by the iron, etc., of which the stoves are made. Stoves, however, waste a great deal of the fuel, are difficult to keep up continuously, produce ashes and dirt, necessitate the carrying of coal and fuel and are otherwise cumbersome and inconvenient.

Local heating by means of illuminating gas, or by means of electricity, is a preferable means of warming rooms, the only objection to them being their relatively greater cost.

25. *Hot air* or furnace heating is very popular for small dwellings. It is cheap in its installation ($75 to $150 per house). The fuel is burned in a cast iron combustion chamber located in the cellar, the combustion chamber is surrounded by an iron jacket containing air, whch comes thereto from the outside through a cold air flue; the heated air in the jacket is conducted through flues and pipes throughout the house, the pipes ending in each room by an opening, called register, which opening may be regulated.

The advantages of air heating are its simplicity and

relatively small cost. While there are a number of grave objections to furnace heat, the principal ones being that the air is apt to become overheated and dry, that dust and smoke may gain entrance through registers and flues, etc.

26. *Hot Water Heating.*—This is regarded as the best form of central heating for small dwellings. Instead of an air jacket over the combustion chamber there is provided a water receptacle, from which a continuous pipe ascends through the house to its uppermost part, whence it returns by a continuous pipe and connects with same water receptacle. The water being heated circulates freely throughout the system of pipes and the radiators attached thereto, and by the heating of pipes and radiators warm the air of rooms. Between the ascending pipes there is usually placed an expansion tank to allow for the expansion of the water by heat.

This system of heating is simple, needs little attention, produces an equable and not too high temperature, is not subject to sudden variations and consumes relatively a small amount of coal.

27. *Steam Heating.*—In this system the pipes are filled with steam instead of with hot water, and the water in boiler is converted into steam. The temperature of pipes and radiators is higher, their size correspondingly smaller, more fuel is needed to convert the water into steam, a higher pressure gained, more expert attention necessary, greater degree as well as variations of heat reached. This system is especially suitable to large houses. Steam heating plants may be located outside of house and convey the heat by means of underground steam pipes.

# CHAPTER IV.

## WATER SUPPLY AND DRAINAGE.

### *QUESTIONS.*

1. What are the sources of water and which are best and why?

2. Give composition of water and state what impurities are found in same.

3. Which are the "water-borne" diseases, and why are they so called?

4. What are the methods of domestic water purification?

5. What are the essentials of a water supply service in houses?

6. What are the common waste matters in houses?

7. How are the common waste matters in houses disposed of?

8. What are the best methods of house cleaning?

9. What is the role of domestic animals and insects in houses?

10. What are the relations between drainage and water supply?

11. What are the methods of final disposal of sewage?

12. What are the methods of immediate disposal of sewage?

13. What are the dry methods of sewage disposal?

14. What are privy vaults and why objectionable?

15. Describe briefly the water carriage of sewage disposal.

*References:*

"Handbook on Sanitation." By Geo. M. Price, M.D. J. Wiley & Sons.

"Disposal of Town Refuse." By W. F. Goodrich.

"Sanitary Engineering of Buildings." By W. P. Gerhardt.

# CHAPTER IV.

## WATER SUPPLY AND DRAINAGE.

1. Water is derived from rains, from surface and from underground sources. Rain water is soft and pure unless it is contaminated by the surface air or by the receptacles in which it is collected. It is not palatable until it is well aerated. The quantity of rain water being variable and inconstant, no absolute reliance may be placed upon this source of water supply, although in rural places cisterns and tanks are commonly provided for the catching and storing of rain water.

Surface collections of water, in the form of lakes, ponds and rivers are a reliable means of water supply, but the water being exposed to contamination of organic decomposition, surface drainage and sewage, such water is dangerous to health.

Sub-soil water is that which is gained from wells and springs. Springs are the outcropping of deep underground water, and are, as a rule, pure and free from impurities, having gone great distances through the ground, through which they filtered.

Shallow wells derive their water from surface drainage and falling rain, and are often contaminated by surface sewage and products of organic decomposition.

Deep (driven or bored) wells, deriving their water from lower sub-soil strata of underground water, are free

from impurities, provided the wells are properly constructed, lined with non-absorbent material, are well covered and are protected from surface contamination.

2. Chemically pure water consists of $H_2O$, but water is rarely in a pure state, as it is a very great dissolvent and is commonly mixed with various foreign ingredients, some of which may be harmless, while others may be deleterious. Water also contains gases like oxygen, carbonic acid and various minerals.

The most important of the foreign ingredients contained in water are those of organic origin, such as microscopic plants, vegetable fungi, detritus of vegetable life, minute insects, infusoria, ova of insects, minute parasites, animal debris, products of organic decomposition, etc. The ammonia, nitrate and nitrites frequently found in water are commonly due to results of organic decomposition. Water may also contain metal in solution, such as iron, lead, arsenic, copper, etc. Water usually contains millions of various micro-organisms, mostly harmless, although at times it may also contain pathogenic germs.

Water containing carbonate of lime is called *temporary hard,* the carbonate of lime being driven off by boiling. When water contains the salts of magnesium, sulphates and chlorides it is called *permanently hard,* as these salts are not removed by boiling. A water without those salts is called "soft." A hard water precipitates its salts on boiling, prevents the softening of vegetables, prevents the formation of soap lather; hence, a soft water is preferred for cooking and laundry purposes.

3. The "water-bourne diseases" come from the germs found in drinking water, but whence come the germs? What is their source?

Chemically pure water is rarely found except in the chemist's flask. Being a universal dissolvent and diluent, water almost always contains some organic or inorganic matter suspended or diluted in it. Even rain water, which is pure before it comes within the ground atmosphere, immediately takes up any impurities with which it comes in contact during its fall upon the ground.

It is obvious that surface as well as sub-soil water is still more contaminated than rain water, the media they go through imparting to the water a large part of their constituents. Indeed there are hardly any sources of water which may not be a cause of the water being contaminated with various impurities.

The most important matter which often contaminates the water supply is sewage, human and animal excreta, which are commonly deposited upon the ground. thrown into water, and are well mixed with almost all waters on the surface, as well as near the sub-surface of the ground. Hence it is nearly always the case that all sources of water supply are more or less contaminated with some sewage matter.

As the pathogenic microbes of typhoid fever, cholera, dysentery, various gastro-intestinal diseases are commonly found in the excreta of the diseased persons, the pollution of drinking water with such excreta is clearly the cause of the "water-bourne diseases" and epidemics.

4. Domestic water supply may be purified by sedi-

mentation, boiling, distillation, chemicals, or by filtration.

By *sedimentation,* or settling, it is possible to free the water from its mechanical impurities and dirt, etc., without, however, much affecting matters held in solution.

By *boiling* all organic matter and germs are destroyed, the taste of the water is, however, changed owing to expulsion of gases.

By *distillation,* a chemically pure water is gained, which may be made palatable by addition of carbonic acid.

By the addition of small doses of borax, boracic acid, potassium permanganate, copper sulphate, etc., the organic matter may be rendered harmless, but as those chemicals are not a desirable addition this method of purification is objectionable.

In ordinary households boiling of water is a good precaution whenever the water supply is suspicious. Distillation, provided the proper apparatus is at hand, is the ideal method.

Water may be purified of all, or nearly all, its impurities by *filtration,* the value of the process depending upon the medium of filtering, the efficiency of the filter and the thoroughness of filtration.

The materials used for filters are wool, asbestos, sand, stone, porcelain, infusorial earth, carbide of iron, charcoal, etc.

Infusorial earth pressed in the form of hollow tubes is used in the Berkfeld filters and are very efficient, although needing frequent cleansing. There are a num-

ber of other filters, quite efficient, provided they are frequently cleaned.

While some of the better filters may remove the impurities, even, it is claimed, all bacteria, from the water, this is seldom the case with filters after they are used for some time.

5. The essentials of a water supply system in the city house are the pipes, the tanks and the water faucets. The pipes are commonly made of galvanized iron; smaller branches may be made of lead. The iron pipes are made with screw joints, the lead with soldered connections. Tanks above the top story are needed in houses where the ordinary street water pressure is not sufficient to drive the water to the upper stories of the house. It is then necessary to have an ample cistern or tank, of wood or iron, to hold a certain amount of water, which is then drawn upon by the inhabitants of the upper floors of the house.

6. The common waste matters in houses are the following: rubbish, garbage and sewage.

7. Rubbish and garbage are disposed of in cities by carting them away in municipal wagons or carts.

8. The best method of cleaning houses is by the vacuum method, by withdrawing all dust and dirt through special vacuum tubes operated by motor. Where there are no vacuum cleaning apparatus the best mode is to use damp cloths. Dusters and any "dry" cleaning are unsanitary.

9. Domestic animals and insects are a source of danger in the house, as they often carry disease germs and trans-

mit these from person to person. Insects are known not only to transmit disease, but also to inoculate it by their bites, as, for instance, in malaria, also plague, etc.

10. The purity of water depends greatly upon the surface drainage of the places near the source of the water supply, as the sewage and other dirt upon the surface is washed and drained into the ground and gets into the water.

11. The methods of final disposal of sewage are the following:

Discharge into seas, lakes and rivers.
Cremation.
Physical and chemical precipitation.
Land irrigation and intermittent filtration, and
Bacterial methods.

12. The methods of immediate disposal of excreta are the "dry" or the "water carriage."

13. The dry methods are by means of pails, earth closets and privy vaults. Where there is a water service within house the sewage may be disposed of through a system of pipes, the pipes carrying the diluted sewage outside into cesspool, field or sewer.

The *pail* system is the simple expedient of gathering the sewage into tight pails, which are periodically removed from house and emptied outside.

*Earth closets* are the same pails, of one or another shape, where the excreta is mixed with earth, and the mixture removed with the closets, or through a system of wide pipes.

14. *Privy vaults* are excavations in the ground outside

of the house, into which the excreta is voided and where it is left until full.

The objections against the pail and earth closet systems are the care they demand, the difficulty of keeping them clean, the need of frequent emptying, etc.

The objections against the privy vaults are their proximity to the house, the putrefactive changes undergoing in them, evolving gases, foul odors, the dangers of flies carrying infection from them into the house, and the greater danger of contaminating the surface ground and polluting the sources of water supply.

15. By the water carriage method is meant the system of disposing sewage with the aid of water, through a system of pipes, called sewers. This system is divided into the *separate* and *combined* systems. In the latter the rain water as well as all waste and sewage water is disposed of through the same system of sewers, while in the separate system separate pipes are used for the rain water and separate for the sewage.

# CHAPTER V.

## PLUMBING.

### *QUESTIONS.*

1. What is sewer gas and why is it detrimental to health?
2. Define the terms: house sewer, house-drain, soil, rain, waste pipe.
3. What are the materials used in plumbing pipes?
4. What are the advantages and disadvantages of each?
5. How are connections made between clay, iron, lead, etc., pipes?
6. Describe each connection—how it is made.
7. What is a trap? What are its various forms?
8. How is the seal lost in a trap?
9. What is siphonage?
10. What is back-pressure?
11. How are they prevented?
12. What is the role of vent pipes in house plumbing?
13. How are the plumbing pipes ventilated?
14. Describe the house drain.
15. Describe the waste pipes.
16. Describe the soil pipe.
17. Describe the branch waste and soil pipes.
18. Describe the rain-leaders.

19. Name the various fixtures in house and materials made of.

20. Describe the water supply for fixtures.

21. What are privy vaults?

22. What are the objections to them?

23. What is a school sink and why objectionable?

24. Describe the pan water closet and why objectionable.

25. Describe the hopper closets and why objectionable.

26. Describe the modern forms of water closets and their advantages.

27. Why are water closets not flushed directly for water service?

28. How are water closets flushed?

29. What other fixtures are there in house?

30. What are drip trays, safes, and safe-wastes?

31. What are the common defects in plumbing?

32. Name the tests made for plumbing.

33. Describe the air pressure and water pressure tests.

34. Describe the smoke tests.

35. Describe the peppermint test and how made.

36. What precautions are to be taken in making a peppermint test?

37. Extract from the Plumbing Regulations of the Tenement House Department.

*Note*—A practical knowledge of plumbing and plumbing inspection is necessary for the inspection of tenement houses, as

well as for the clerk having charge of the reports and papers of the inspectors. This does not necessarily mean that one must be a practical plumber, but that he should have a more or less intimate knowledge of the rudiments of plumbing and be able to make a practical inspection of plumbing.

The following brief exposition of plumbing covers the whole subject, as far as the inspector may wish to know, for the successful passing of the Civil Service examinations and the subsequent performance of his duties. Practical inspection in the field will teach all other minor points not here described or mentioned.

The student who wishes to make a more detailed study of the subject is referred to my "Handbook on Sanitation," also to Hellier's book on Plumbing, and Gerhardt's works on the same subject.

# CHAPTER V.

## PLUMBING.

*Sewer Gas.*—Just as the air in inhabited rooms is more impure than the air outside, the air within the street sewers is more impure than the air in the street, on account of the impurities added to it by the decomposition of the sewage matter flowing therein, the putrefactive materials, and the consequent foul gases and odors evolved.

The impure air of sewers has been erroneously named sewer *gas,* although it is no more a distinct gas than the impure air of a room. What is meant by sewer gas is the sewer air filled with various impurities. The composition of sewer air is not uniform or constant, as it depends upon the size of pipe, the velocity of flow within the pipes, the volume of the flow, and the means of sewer ventilation.

The most important of the impurities found in sewer air are carbonic acid, carbon dioxide, ammoniacal gases, sulphuretted hydrogen and organic matter. Most of these impurities are more or less toxic, and their inhalation in large quantities, or in small quantities, but for long and continued periods, is injurious to health and may become a menace to life.

The plumbing system of the house consists of the *fixtures* for the receptacle of the various waste matters and of the several *pipes* through which all the waste matter passes into the street sewers.

While all the waste matters of the house could be dis-

posed of through one pipe, this would be inconvenient, as the various waste matters are in different parts of the house; thus, rain water in the extreme rear or front of the house, the kitchens with their waste from sinks, laundry tubs, etc., in another part of the house, while the soil of the water closets is in a separate part of the house. We have, therefore, different pipes for the different waste matters. Thus there are *rain leaders* for the disposal of all the rain from the roof; a *waste pipe* for the dispsal of the waste from kitchens, and a *soil pipe* for the disposal of the sewage from the water closets.

The rain leader, the main waste pipe and the main soil pipe are therefore the main pipes of the house running vertically from the upper floors into the cellars or lowermost floors. When these pipes arrive in the cellar there is no further need of their separate existence, and they there join one continuous horizontal pipe called *house drain,* which takes all the refuse matter from the house pipes and discharges it into the street sewer. The short pipe connecting the house drain from its end two feet in front of the foundation wall of the house with the street sewer is called *house sewer.*

## MATERIALS USED FOR PLUMBING PIPES.

The following materials have been employed for the manufacturing of the various plumbing pipes: clay or vitrified pipe, sheet metal, lead, cast iron, wrought iron, brass, nickel, etc.

*Clay pipe* was formerly very extensively used by plumbers for house drains and house sewers, but at present its

use is forbidden, and all existing clay house drains are being ordered out. The disadvantages of clay pipe are their brittleness and softness, which cause their frequent breakage. There is hardly a clay house drain in existence which will prove upon proper test to be perfectly gas tight.

*Sheet metal* and tin are sometimes used for pipes, but owing to the thinness and softness of these materials they are not fit to be used for any plumbing pipes except rain leaders.

*Lead* is extensively employed for plumbing pipes, but only for pipes of a very small diameter, such as traps, waste and vent branches, and water supply pipes. The disadvantages of lead for pipes are the following: (1) their expense; (2) their weight; (3) the softness of the lead, causing it to be easily broken into, gnawed through by rats, etc.

*Cast iron* is the material now universally used for the manufacture of all vertical and horizontal pipes. The advantages of cast iron are that it is cheap, strong, durable and hard, makes a strong, gas tight joint, and can be easily cast into the various forms employed for pipes. Cast iron pipes are manufactured in two qualities: the Standard, or light weight, and the heavy iron pipe; the difference being in the respective weight of the linear foot of the pipe. The light weight pipe is unfit for use in plumbing, especially of pipes of a greater diameter than 2 inches, as it easily breaks and cannot withstand the strain imposed upon the pipes. Whenever cast iron is used, heavy iron is understood.

*Wrought iron* is sometimes used for pipes, especially in large public buildings, office buildings, etc., where the ex-

pense of its installation is of no special consideration. Wrought iron is harder, stronger, more durable than cast iron, and its joints, being screw joints, are prefectly gas tight. The only objection against its use is the great expense, and perhaps also the difficulty with which any repairs can be made with pipes of such hard and unyielding material. Wronght iron is used in the so-called "Durham system of plumbing."

Brass, nickel and other such materials are rarely used for pipes on account of their expense.

## CONNECTIONS AND JOINTS.

Plumbing pipes of whatever material they are made are manufactured in short sections or lengths, and in order to install the plumbing system in a house it becomes necessary to connect the various several sections together, so as to make one whole system of pipes. The various connections are made according to the character of each individual material.

*Clay pipe* sections are joined by means of *cement.*

*Lead pipe* sections are joined by means of so-called *solder wiped* joints. A solder wiped joint is made as follows: the two ends of lead pipe are fitted together, and both ends are covered with hot solder, which is worked about and wiped around with a cloth until it forms an oval lump around the joint, which, upon hardening, is gas tight.

*Cast iron* pipe sections are joined by means of so-called *lead calked* joints. These are made as follows: the pipes are usually cast with an enlarged "hub" on one end. When a joint is to be made the plain or "spigot" end of one pipe is

fitted and inserted into the head or hub of the other pipe, the space forming between the two is first half filled in with oakum and then filled in with hot molten lead, which upon cooling is rammed in or "calked" into so as to make a perfectly fitting, hard and gas tight joint.

*Wrought iron* pipe sections are joined by means of screw joints, as the material is hard enough to enable the making of threads for these joints.

*Lead and iron* sections cannot be joined by any of the above methods, because lead cannot be soldered to iron, nor can it be calked into iron, as the lead pipe is soft and cannot stand calking. When we have to connect two sections of pipe, one of lead and the other of iron, we use a connecting link of such material as can be soldered to lead and which is also hard enough to be calked into iron; such material we possess in brass. Lead is joined to iron by means of a brass ring, fitting or "ferrule," which is soldered to the lead by a wiped joint and the other end of which is lead calked to the iron in the ordinary way.

## TRAPS, LOSS OF SEAL, VENT PIPES.

By the installation of the plumbing system in the house we create at the same time a direct communication between the rooms of the house and the street sewer with which the house pipes are directly connected, and thus open our rooms and houses to the impure air from the street sewer. In order to prevent the entrance of the sewer air traps have been devised.

A *trap* is a bend in pipe so constructed as to hold a quantity of water, which effectually closes all communica-

tion between the sewer and house end of the pipe, thus preventing sewer air from coming into the house. The water in the trap is called *seal.*

Traps come in various shapes and forms; the traps commonly in use are the "so-called" S trap. All the fixtures in the house are therefore provided with traps so as to exclude sewer air from the house.

## LOSS OF SEAL.

As long as the water remains within the trap the bad air from the sewer end of the pipes cannot get into the house; but the water in the trap, or seal, can be lost by evaporation, momentum and capillary attraction, as well as in other ways hereafter to be described. When fixtures are not used for a long time the water in their traps may evaporate, thus leaving the trap empty and admitting sewer air. Evaporation is prevented by frequent flushing of traps, also by filling up traps of fixtures which are not to be used for a long time with oil, glycerine or other non-evaporable liquid.

The seal in a trap may also be lost by a sudden discharge of the fixture, or momentum, so that all the water is discharged forcibly, leaving nothing in the trap. This can be prevented by careful use of the fixtures. When paper, thread etc., are left in the trap they may absorb enough water, and also empty it into the pipes, leaving the trap empty and unprotected. The only prevention is careful using of the fixture and flushing it with clean water.

## SIPHONAGE AND BACK-PRESSURE.

The water within a trap, the so-called seal, is not very secure; it is easily influenced by the various currents of air and water flowing through the pipes. Thus when there is a violent agitation of air within the pipes, or when there is an expansion of the air in the pipes due to increased temperature, or to presence of putrefactive gases, the water in the traps may be forced back out of the fixture, or at any rate enough impure air and gases can be forced through the water in the trap back into the room. This is called "back pressure."

On the other hand, a violent, sudden discharge of a large volume of water through some of the large caliber vertical pipes may be made with such momentum as to create a powerful suction and aspirate the water in the traps of fixtures. This is called "siphonage." In order to prevent siphonage and back pressure, it is necessary to have a column of air separate from the trap but connected with it, which would serve to relieve the water in the trap from the back pressure, as well as be used during sudden flows of water downward to prevent siphonage. This column of air is furnished by the vent pipes. From every trap in the house a pipe containing nothing but air leads towards a large air pipe, "the vent pipe," which contains nothing but air, and serves to furnish a column of air to be pressed upon or siphoned out instead of the water of trap, and thus prevent unsealing of the traps by back pressure and siphonage. The vent pipes are therefore the additional vertical pipes in the plumbing system, and

serve to ventilate the air in the pipes and prevent siphonage and back pressure.

## VENTILATION OF THE PLUMBING PIPES.

The air within the house pipes is seldom pure, loaded as it is with products of decomposition going on within the pipes. In order to render the air in the pipes purer the plumbing system of the house must be properly ventilated. When we wish to ventilate a room we let out the bad air by opening a window; when we wish to ventilate the pipes we leave them open at their upper ends and extend them above the roof, letting out the impure air from the pipes. All vertical pipes are therefore extended above the roof and there left open. But just as in the case of badly ventilated rooms when we wish to entirely change the air and in a shorter time we also open a door besides having opened the window, just so we provide the house pipes with a *fresh air inlet,* which serves to let in the fresh air from the street into the pipes. The fresh air inlet pipe is connected with the house drain in the cellar and leading from it into the air box in the sidewalk near the curb, the air box being covered with a grating.

Additional means of ventilating the pipes within the house are also the above described vent pipes.

## THE HOUSE DRAIN.

The house drain is the main horizontal pipe with which all the vertical pipes of the house are connected,

and which discharges its contents through the house sewer into the street sewer.

The house drain is made of extra heavy cast iron pipe, with all joints lead calked, and with a diameter of at least 6 inches.

The position of the house drain is either alongside the ceiling or wall of the cellar, in which case it is supported by hooks and fasteners; or it runs above the cellar floors on specially constructed 9-inch brick pillars. The house drain may also rest upon the floor of the cellar, or be under ground, in which case a foundation of cement must be prepared for it. The house drain does not lie flat, but with an incline, or fall, that is, its sewer end is lower than the house end, so as to facilitate the flow of the waste matters within. The rate of the fall must not be less than one in 60, or one foot in 60 feet; i. e., if the house drain is 60 feet long its sewer end must be one foot lower than its beginning in the cellar. The connections of the vertical pipes are by means of Y branches. There should be hand holes for cleaning purposes at frequent intervals, and especially near the main trap, and near the junctions of the vertical pipes; these hand holes must be covered gas tight by means of brass screw ferrules.

The main trap of the house drain should be as near the front wall as possible and should have cleaning hand holes on both sides.

The fresh air inlet pipe should not be less in size than 4 inches and made of iron. It is connected on the house side of the main trap.

## THE VERTICAL PIPES.

*The soil pipe* is the main vertical pipe which receives the sewage from one or more water closets. It is made of extra heavy cast iron pipe, with lead calked joints, and is at least four inches in diameter, and 5 inches when five or more water closets are connected with it. The soil pipe is located in a special vent shaft. The soil pipe must not be trapped at its base, but joined to the house drain by a Y connection.

## THE WASTE PIPE.

The waste pipe is the pipe to which sinks, laundry tubs, etc., are connected; it is of heavy iron, with lead calked joints; it should be exposed, so as to be easily accessible in case of defects; should be securely fastened to the walls with wrought iron hooks, and should not be trapped at the base.

All vertical pipes must be extended above the roof and left open, or covered by a wire basket. The extension must be two feet above the highest coping of the roof and far from chimneys or ventilating shafts. The pipes extended above the roof must not be less than 4 inches in diameter, and if the vertical pipes are smaller they should be increased after they extend above the roof to 4 inches. The size of main waste pipe where sinks from five floors are connected with it is 3 inches, otherwise 2 inches.

## BRANCH WASTE AND SOIL PIPES.

Branch soil pipes and water closet traps must be of

cast iron and not less than 4 inches in diameter; branch waste pipe of smaller fixture may be 1½ and 2 inches in diameter; these may be made of lead, and must have a fall of at least ¼ inch per foot, and connected to the main waste or soil pipe by Y branches. They should also be provided with cleaning caps, fitted gas tight.

## TRAPS.

Every fixture must be separately trapped within 2 feet from the fixture. Several laundry tubs may be connected with a single trap. No fixture should have more than one trap.

## VENT PIPES.

All traps must be connected with branch vent pipes leading into main vent. Main vent pipes are of iron and should be extended above roof. The size of vent pipes is 2 to 3 inches.

## RAIN LEADERS.

Every building must be provided with metallic leaders for carrying off the rain water from the roof, so as to protect walls and foundations from dampness. Rain leaders inside the house must be made of cast iron, outside leaders may be of sheet metal from the roof down to 5 feet from the ground, where they should connect with a cast iron pipe trapped under the ground. Leaders must not be used for other purposes.

## FIXTURES.

The plumbing fixtures within the house are as follows: Sinks, wash basins, laundry tubs, bath tubs, urinals, water closets.

Sinks are made of cast iron, plain or enameled, and provided with strainers at their outlet.

Wash basins are made of porcelain or marble. Laundry tubs are of soapstone, slate or enameled iron (wooden tubs must not be employed).

Urinals are, as a rule, not used in tenement houses. All the above fixtures may be provided with overflow connections to prevent overflow of water; these overflow pipes must discharge into the branch waste pipe of the fixtures above the trap.

## WATER SUPPLY FOR HOUSE FIXTURES.

The house is supplied with water by means of a branch of the street main, the house main, which is of galvanized iron, and should be of sufficient diameter to amply supply the house with water at all times. Within the house branches of the house main may be of lead. The house main should be provided near its entrance with stop cock to shut off the water in case of leakage. It should be protected from freezing. When the street water pressure is not sufficient to drive the water to the upper floors of a house a tank must be provided, which tank may be filled by pumps run by an engine. House tanks are of wood, iron, or wood-tin or copper lined; they should be well covered and be dust proof, and rest upon

special iron beams. The overflow pipe from the tank must not be connected with any part of the house plumbing, but should either empty upon the roof, or into a sink. All fixtures in the house are directly connected with the water supply pipe, except water closets, which should not be connected directly to prevent contamination of water supply.

## WATER CLOSETS.

*The privy vault* is used wherever there are no street sewers. In its primitive form it is nothing but a hole in the ground, a few feet deep, with a plank or rough seat over it, and an improvised shed over all. Usually the privy vault is not far from the house, is overfilled with excreta, the liquid portion of which drains into the ground and contaminates adjacent wells and water courses, and the solid constituents are left to decompose, putrefy and become a nuisance to the neighborhood.

*The school sink* or trough closet is a form at present expressly prohibited in New York, and, according to the Tenement House law, all school sinks are to be removed and replaced by new forms of water closets. The objections to school sinks are that the iron trough gets corroded, the large surface presented by the trough and upper brick work are covered by adherent excreta; they never get well cleaned and cannot be well flushed.

## PAN WATER CLOSETS.

This is an obsolete form of water closet formerly

quite in fashion, but now, fortunately, never used, and prohibited by law in all new houses. It consists of several parts: (1) A D trap cannot be thoroughly flushed, (2) a large iron container which gets corroded and is difficult to clean and flush, (3) a bowl set into the container, and (4) a copper pan placed under the bowl and operated by a handle. The whole gets easily out of order and becomes a nuisance.

## HOPPER CLOSETS.

Hopper closets are so called on account of the "hopper" form. They are made of earthenware or iron, enameled inside. There are long and short hoppers according as the trap is under the floor or above it; the short hoppers are preferable, as they do not present so much surface to be soiled.

## YARD HOPPER CLOSETS.

Water closets placed in the yard are usually of the long hopper form, but instead of each hopper closet having a separate trap, they have one single trap for the whole row of three to five hoppers.

## MODERN WATER CLOSETS.

The modern water closets are all made of earthenware or porcelain; they are made—bowl and trap— in one piece, and in such a form as to be readily cleansible and kept clean. When combined with proper flush-rims, which are flushed from cisterns, the modern water closets

present a clean and good appearance. The washout and the wash-down are older forms of these water closets, while the numerous "siphon" water closets are a still greater improvement.

The washout water closet is somewhat objectionable for the reason of the large surface it presents for dirt contamination and for the difficulty in cleaning it out by one flush from cistern. The wash-down is a good form of closet.

The siphon water closets are very good and practical; they have the contents removed by the siphonage of the water acting through a long crooked outlet, the water in the basin acting as a trap. Of the siphon water closets the so-called "siphon-jet" closets with low down tanks are the best.

## FLUSHING APPARATUS.

Formerly water closets were provided with a direct pipe from the water service system, but this was found to be inadequate, because the volume of water given by a direct flushing pipe was not adequate to flush away the excreta, but mainly because it was thought that there is danger of the contamination of the drinking water from the water closets. All such fixtures are now flushed indirectly from small cisterns placed over the closets and connected with them by means of a flush pipe. The cisterns are made of iron, or of wood-metal lined, and are fitted with a plug operated by a handle, so that on pulling on the chain the plug is lifted out of the socket and the

water allowed to rush out through the flush pipe. A separate ball and cock arrangement is provided to shut off the water supply when the cistern is full. The cistern has a capacity of 3 to 5 gallons, must be placed directly over the closets, at least 4 feet above same, and the flush pipe should be at least 1¼ inches in diameter.

## OTHER FIXTURES.

Stationary refrigerators, or refrigerators in liquor, grocery and butter stores, frequently have a small tin or rubber pipe running into the cellar. Such pipe must never be directly connected with the plumbing system of the house, as is very frequently the case, when ignorant plumbers break a hole in the house drain, or soil pipe and slip in the refrigerator pipe, thus allowing the sewer air to enter the refrigerators. Such pipes must be let run into properly trapped, sewer connected, water supplied, open sinks.

*Drip trays* are enameled metal pans placed on the bowls of the water closets to prevent the dripping of urine on the floor; they are used only on water closets which are inclosed by woodwork; they get corroded, and soon become a nuisance. They are prohibited by the law, and in open water closets with slate floors are of no use. The same can be said of the old so-called "safes," which were simply sheets of lead with raised edges, placed on the floors under sinks, basins and water closets to catch the drippings. They soon become a greater nuisance than the one sought to prevent and are now obsolete; so are

the small pipe "wastes" which were used to be connected with those "safes."

## COMMON DEFECTS IN PLUMBING.

The most common defects in the plumbing of a tenement house are the following:

Defective material; house drain made of earthenware, or of light weight iron; cracks and holes in the horizontal, vertical or branch pipes: Y and T branches left open, or closed up with rags, oakum or cement; loose or badly fitting covers on hand holes and caps of traps; defectively calked joints, loose joints, corroded iron pipes, bent and defective lead pipes; vertical pipes unextended, or the extended portions of which are provided with return bends or cowls. Most of these and similar defects in plumbing can be seen by the inspector on careful examination, especially where plumbing is exposed and easily accessible, but when pipes are hidden or defects are minute and invisible other tests are needed.

## PLUMBING TESTS.

Plumbing pipes are tested by the following tests: Air, water, smoke and peppermint.

*The air pressure test* is applied to the pipes in the casting foundry, and consists in the test of the strength and tension of the pipes by means of compressed air.

*The water pressure test* is applied to the pipes in newly built houses, before the connection of the vertical pipes with the fixtures or with the sewer. The test is applied

by the plugging up of all openings of the pipes and filling up with water to their tops. A lowering of the level of the water in the pipes will indicate a defect in some part of the pipes.

*The smoke test* is applied to old plumbing, as follows: Smoke is forced into the pipes from some burning material (or an explosive smoke-producing chemical is let into the pipes, usually into the house drain), all open ends of the pipes within the house and on the roof are plugged up, and the appearance of smoke is watched for wherever there are defects in the pipes.

*The peppermint test* is the one most commonly applied to old plumbing. This test is applied as follows: All open ends of the pipes on the roof, except one, are plugged up with waste paper, rags, etc.; into the one open pipe half of a pail of hot water is first poured in, followed by the contents of one or two 2-ounce bottles of peppermint oil, this followed again by the rest of the pail of hot water. The inspector then follows the course of the pipes downward, noticing the odor of the peppermint which will escape wherever there is a crack or any defect in the pipes.

The precautions to be observed by the inspector in applying this test are the following: (1) See that no fixture is used during the process of the test, as every disturbance of traps will allow the escape of the peppermint therefrom. (2) The handling of and pouring in of the oil should be done by an assistant in order that the inspector may be free from the odor of the peppermint. (3) The inspector should see that the connection of the rain

leader with the house drain be closed either by the water in the trap of the rain leader, or, if the leader is not trapped, by some other means; otherwise the peppermint will escape through the rain leader. (4) The fresh air pipe should be plugged, otherwise the peppermint will escape through this pipe.

## EXTRACTS FROM THE PLUMBING REGULATIONS OF THE TENEMENT HOUSE DEPARTMENT.

1. "When an opening in a pipe is covered by a "band" or "saddle" and is gas-tight, no violation need be reported, but when the band or saddle is broken, loose, or otherwise not gas-tight, the length should be reported for removal as defective. The Department will not consent to the use of saddles or bands in complying with orders issued by this Department.

2. Sizes of holes in a cast iron pipe which can be reamed out and plugged are as follows:

| | |
|---|---|
| 2-inch pipe | ½-inch hole. |
| 3-inch pipe | ¾-inch hole. |
| 4-inch pipe | 1-inch hole. |
| 5-inch pipe | 1¼-inch hole. |
| 6 and 8-inch pipe | 1½-inch hole. |

Whenever the opening in a cast iron pipe is too large to admit of reaming out and plugging with a screw plug, as per table above, a new length should be ordered.

### SEALING OF PIPES.

3. When a fixture has been removed all openings in the pipes must be properly closed in the following manner:

(a) Cast iron hubs must be closed by the use of an iron plug and properly lead calked joint.

(b) Wrought iron pipe must be closed by the use of a screw plug or cap.

(c) Lead pipes should be either removed and iron pipes closed as above, or the ends should be soldered gas tight.

4. Drip trays of water closets are not to be ordered cleaned, but if foul and corroded should be ordered out.

5. Sheet lead safes under water closets must be kept clean and dry and all wastes from them closed.

6. Plumbing fixtures not in use should be frequently flushed, or should be ordered out.

7. Pan water closets when foul, corroded and defective should be ordered out whenever found.

8. Long hopper closets are to be ordered out if foul or corroded.

9. Off-set water closets must be foul, defective and a nuisance before being ordered out.

10. A sink on stair landing between two floors is considered adequate."

# CHAPTER VI.

## TENEMENT HOUSE INSPECTION.

*Qualifications*—The position of Inspector of Tenements is a new one, and created only since the establishment of a separate Tenement House Department, but the inspection of tenements is not new and was part of the general duties of sanitary inspectors in the Health Department.

Tenement house inspection is destined to become a distinct profession to which one should devote his entire energies, and which demands certain qualifications from those engaged in the work just as other professions demand of their devotees.

He who intends to devote himself to tenement house inspection must, first of all, be blessed with a sound, robust constitution, and perfect health, otherwise he will not be able to withstand the wear and tear incident to his work, for we must bear in mind that the work of tenement inspection is a very difficult one and requires a person with a strong constitution to do the work properly. The qualifications as to education are not very high, although what he needs to know he must know thoroughly. While, therefore, a college education is not demanded from the would-be inspector, such education will be beneficial, and will assist the inspector in many ways. The following subjects are obligatory for the inspector and candidate for inspectorship: (1) A knowledge of the language so as to be able to write a report; (2) a knowl-

edge of arithmetic and mensuration, as indicated in another part of this book; (3) a theoretical and practical knowledge of plumbing.

A tenement house inspector should be sober, industrious, observant, vigilant, honest, conscientious, and constantly bear in mind that upon the proper performance of his duties depend the welfare, comfort, health and the very life of the community in his charge.

*The Art of Inspection*—In the inspection of tenement houses one has to apply the teachings of sanitary science to a practical field, and such inspections require not only a scientific training but also a certain art and skill which only come with experience and training. An experienced inspector will quickly detect nuisances which the novice will seek for hours; and the report of an experienced inspector will, as a rule, show defects and violations which a new man will omit and neglect. With time and experience the inspector gains confidence in himself, learns the pitfalls and dark places, comes to understand the tricks played upon him by builders, owners and plumbers, and learns the art of inspecting a house thoroughly so that nothing of any importance will escape his observation; and also learns to make a report of his inspection in such a manner as to show his superiors the actual conditions. With the existing various printed cards devised by the Tenement House Department it is a matter of less difficulty to make a thorough inspection, than previously; the novice and probationary inspector, however, may still find it a matter of difficulty at first. The time which it takes to make an inspection of a house differs of

course not only with each inspector, but also with the kind of inspection to be made. An inspection upon a complaint, when the inspector is directed to pay attention to the matter of complaint, only may take but a few minutes; on the other hand a thorough inspection of a large six-story house, with a measurement of all spaces, rooms, etc., and the cubic spaces of certain rooms may take from three to six hours.

The methods of inspection may differ with every inspector. Some inspectors begin their inspection from the cellar and work up to the roof; others begin at the roof and inspect while going down to the cellar. A combination of both methods is the best, in my opinion, as the inspector makes the original inspection while coming up from the lowest story to the highest, and then verifies, adds to and corrects his notes while going down again, thus insuring thoroughness and accuracy.

The following notes and remarks on tenement houses and their inspection will, I trust, be of benefit to those interested in the subject:

*Tenement Houses and their Inspection*—The legal term of a tenement house is so broad that it includes houses of various construction and various plans, types, etc. The three-story dilapidated shanty in Poverty Hollow, as well as the modern twelve-story apartment house facing Central Park, are both tenements in the eyes of the law, although there is an infinite gulf in their character, and in their form of construction. Between these two extremes there are various gradations and many classes of tenement houses, which the inspector comes to learn with

practice and experience, and it is important to remember that not all tenement houses are alike, nor the methods of their inspection the same. In every inspection we make we are to apply all our knowledge and practical experience to the subject at hand, and thus are enabled to make a thorough and comprehensive inspection and report.

*Site*—The site of the house we are to inspect is the first thing which ought to draw our attention, for upon the character of the site greatly depends the construction and salubrity of the house. Houses built upon marshy or made land are, as a rule, damp, and their cellars constantly wet. In a city like New York, situated as it is, near the sea and surrounded by water, a large number of houses are situated upon land which was formerly marshy, or was gained from the sea by filling in the ground, and consequently the ground is apt to be wet, and unless the houses are built so as to make them perfectly damp-proof, which is not, as a rule, done in tenement house construction, the lower stories of such houses will be damp. Moreover, all houses situated near the shore of the sea are subject to the action of tide water, which may back up either through the ground or through the street and house sewers and is apt to fill the cellars of the houses with water. The Tenement House Act makes it mandatory for owners of houses situated upon marshy ground and made land, or where the pressure of the ground water is strong, to make the cellars damp and waterproof; this is, however, not so easily done as one would imagine.

*The Surroundings of the House*—The first matter which naturally comes to the view of the inspector upon approaching a house to be inspected are the surroundings of the house; the street, the sidewalks, the lots or houses immediately adjoining the house to be examined. The streets, their character and width have much to do with the cleanliness and salubrity of the house, as houses situated upon narrow streets will not have the ventilation of houses upon broad avenues, nor will the cleanliness of houses be as good on streets habitually littered with filth, as those upon streets well paved, swept and cleaned.

The *sidewalks* are also of much importance, the more that for their condition and cleanliness the owner of the house is responsible. Sidewalks, the pavements of which was sunken and broken, cannot be kept clean, and are a source of trouble by the pools of dirty stagnant water upon them and the filth which collects in the holes and sunken portions; they are also a source of danger to life and limb.

The *facade* of the house, with its projecting window sills, eaves gutter, rain leaders and fire escapes, are the next points to draw the attention of the inspector. The *eaves gutters* are usually of sheet metal and are often choked up with dirt, or full of holes through which storm water runs down the front of the building, wetting the walls. No better is the condition in which the *rain leaders,* when they are in the front of house, are often found. The *fire escapes* must undergo careful scrutiny by the inspector, to determine whether they have no wooden balconies, or wooden slats in the floors, and also if they are not obstructed, as they

commonly are. The approaches to the house, the front stairway leading to house, and the one leading down to cellar, the rails and banisters of stairways, and the condition of the front area are to be inspected carefully to see if they are not broken and are in good repair and condition.

*The Yard*—After having inspected and made notes of the points just mentioned, the inspector goes through the hall of the house and enters the yard. Here the matters of importance for the inspector to notice are the following: The rear of the house with its eaves gutter, rain leader, fire escapes, and stairways from house to yard and from yard to cellar, as well as the rear area of the cellar; then the yard itself and any and all fixtures situated upon it.

The eaves gutter, rain leader, fire escapes and stairways are to be inspected the same as in the front of house. The *yard* is to be carefully examined as to its dimensions, also as to whether it is paved with flagstones, or is concreted and cemented, also if properly graded so that all water falling upon the yard shall run off into a sewer connected and trapped cesspool which ought to be provided in a central portion of the yard. The cleanliness of the yard and areas is, of course, of importance, as they are apt to be litered with dirt, ashes and garbage. Sunken parts of yards and holes are places for the accumulation of filth and stagnant water and should be noted as to their location and depth.

The fixtures and structures sometimes met in yards are the following: Woodsheds, hydrants, privy vaults,

school sinks and yard hopper closets. The small dilapidated, leaky, rickety *sheds* used for storage of wood and all kinds of detritus, are a source of nuisance in yards and should not be tolerated in large tenement house yards as breeding places of vermin and filth.

*Privy vaults* are not frequently met, as they are being rapidly ordered out by the municipal authorities from all streets where there are sewer connections.

There are as yet several thousand *school sinks* in New York, in spite of the provision of the Tenement House Act ordering their removal after the first of January, 1903. Wherever they are in a yard they are a distinct and serious nuisance. Even when newly and properly constructed the school sink is apt to be a source of danger by the excreta adhering to the large exposed surfaces and the difficulty to clean them thoroughly; but especially dangerous are these obsolete fixtures when in an old and dilapidated condition and when not cleaned at least several times a day. The school sinks are not only a menace to the health of the tenants of the houses in the yards of which they are situated, but they frequently are a source of the fouling and wetting of cellars of the adjoining houses to which they are attached, as the brickwork of the school sinks is often loose and all sewage and water overfilling the school sinks naturally gains entrance into the cellars of the houses to which the school sink structure is adjacent. The *yard hopper closets* are not very much preferable to school sinks, for the reason that any plumbing fixture outside of the house cannot and will not get the necessary attention to keep it in proper con-

dition, as such fixtures would get within the house. The flushing of the yard hopper closets is done as a rule by automatic rods and valves which are apt to get out of order as well as to freeze during winter. On the other hand it is very difficult to construct plumbing fixtures in a yard which can be flushed from cisterns and tanks, as these tanks will freeze in winter, and plumbers have not as yet invented a method to prevent it.

In inspecting the yard of old tenement houses the inspector may sometimes notice a large stone slab covering a hole from which emanate very foul odors. These are the *cesspool traps* into which the drain pipes from the school sinks or yard hopper closets are led, where the sewage from them collects and is then drained off through the sewer pipe opening in the opposite wall of these cesspools into the yard drain going through the yard into the cellar. Needless to state that such cesspool traps are a nuisance ,and whenever met with should be ordered out and the pipes from the water closets ordered to be made continuous.

*The Cellar*—Perhaps the most important part of the house and the one most carefully to be examined is the cellar of the house. The cellar has to be examined as to its occupation, its constructions and its fixtures.

The law makes careful provision about the *occupation* of cellars for either business or for living purposes. The businesses previously carried on in cellars of tenement houses were very dangerous to the tenants of the houses above cellar; thus the many rag and junk shops, the feather and cotton, paper stock and excelsior, as well as

the hay, feed and straw stores in cellars were frequently a menace to the lives of the tenants of the whole house. All these are prohibited by the Tenement House Law, and will have to seek other quarters. The other businesses which are located in cellars and frequently become a nuisance are the *bakeries,* of which there are so many in the tenement house districts. I trust that the time will come when a law will be passed that no bakery shall be located not only in the cellar of a tenement house, but in *any* cellar, for there is no greater danger to health than a filthy bakery in cellars. Outside of the danger from fire, which can hardly be prevented much by the perfunctory fireproofing ordered by the law, the presence of a bakery in a cellar means the presence of dirt, filth and vermin, and no cellar can ever be kept in a sanitary condition with a bakery on its premises.

The inspection of bakeries is partly within the province of the Tenement House Department, and the inspector should know the points to be looked for. The following is a brief recapitulation of the points to be inspected in the examination of a bakery: Location; fireproofing of walls and ceilings; fat boiling; openings into buildings; windows, transoms, shafts and stairs; the exposed posts and girders; the floor, whether damp-proof, and of earth, wood, concrete or cement; the light and ventilation of the bakery; the presence of sinks and water closets; the character of the oven and whether a separate flue is provided; the character of the fireproofing of the partitions, walls and ceilings; the cleanliness of the cellar and whether bakers sleep there, etc.

*The occupation of cellars and basements for living purposes* is carefully provided for by the law, and the inspector must remember all the various sections of the law to see if they are complied with.

The *construction* of the cellar has a great deal to do with its salubrity and its influence upon the health of the tenants of the whole house. The depth of the cellar, i. e., the level of its ceiling above or below the adjoining ground, is a matter of great importance, as low and deep cellars are not healthy and are apt to be dark, damp and musty. Upon the depth of the cellar partly also depends its dryness, as cellars, the floor of which is below the tide level, or below the ground water level, will be partly filled with water, which cannot be rid of by any but very expensive means. Therefore the inspector is to carefully measure the height and level of cellar, especially if water is found therein, in order to determine the source of the water.

The *floors* of cellars may be of earth, stones, concrete, wood, cement, asphalt. An earth floor is bad, because it is, as a rule, damp, and such a floor can be dry in houses situated upon elevated and dry sites only. Wood floors are still worse, as they are apt to rot and are saturated with moisture and often filled with vermin. Cellars, the floors of which are of stones mixed with earth, are unsatisfactory; the best floors are of a layer of concrete with cement or asphalt on top. The condition of the floor is of much importance, as a floor with holes and sunken parts cannot be kept clean and in sanitary condition. Walls and ceilings are best of plaster covered

with sheet metal and well-painted, preferably with white paint. The woodsheds and coal bins in cellars are a source of nuisance, as they are rarely, if ever, cleaned and are often the dumping ground for the rubbish of the whole population of the house.

The *light and ventilation* of the cellar depend upon the windows and openings from the cellar into the outer air; the more of these and the larger they are the better the light and ventilation. The cleanliness of the whole cellar depends upon the tenants as well as upon the owner and caretaker, who should not allow any old stuff, furniture, mattresses and other rubbish to be kept in the cellar, and should subject the cellar to frequent and periodical cleaning and disinfection.

The fixtures in the cellar which must engage the attention of the inspector are the plumbing fixtures and pipes located therein. The *plumbing fixtures* found in the cellar are the following: Sinks, water closets, refrigerator wastes, rain leaders, vertical soil and waste pipes, and the main house pipe—the house drain.

*Sinks and water closets* when they are situated in cellars are often in bad condition. Whenever there is no need for water closet accommodations in the cellar they should not be there, and when they are there they should be kept in proper repair and order, and frequently flushed. The waste pipes from the refrigerators in the house, or in the stores, require attention, as they are, as a rule, defectively connected. Either the waste pipe is left open and drains on the floor of cellar, causing dampness thereat, or it is connected directly with the house

drain, or other pipe in the cellar, thus allowing sewer air to enter the refrigerators and rooms. Whenever the inspector discovers such a connection he should order it out. The part of rain leader seen in the cellar is the one where it connects with house drain, and where the rain leader trap should be seen; such trap should be within the house to prevent freezing of the water seal therein. The portions of the vertical pipes, the waste and soil pipes seen in the cellar are quite considerable and they should be carefully examined for defects, cracks, holes, open Y branches, etc. But the most important of all pipes in cellar is the *house drain*, and to its examination the inspector should devote ample time, for its importance demands it.

It is fortunate that plumbers no longer put in earthenware house drains in new houses, although this is not an act of their free will, but rather a result of a wise municipal provision. There is no greater nuisance, and one fraught with so many dangers to the population of the entire house as an earthenware house drain, especially when it is, as is the rule, found *under* the ground of the cellar. Earthenware house drains were made 6 to 12 inches in diameter, and there was not one which did not settle, crack and break after a few months of service, with great holes here and there—the whole a channel of indescribable filth, giving off miasmatic effluvia, saturating the ground with liquid sewage, poisoning the air of the cellar and the whole house, and spreading disease and pestilence. Whenever such a house drain is found, even if its conditions seem satisfactory, it should

be reported and ordered out, and replaced by an iron house drain, preferably above cellar, for even when house drains are of cast iron their presence underground is not desirable. One of the cardinal rules in plumbing ought to be to have every piece of pipe entirely exposed and in view, where it can always be seen, examined and repaired when necessary. Whenever any pipe—and this is especially true of a pipe of such importance as the house drain—is hidden under ground, where it is unseen and inaccessible, the chances for its good condition are very small. There are so many ways and means by which pipes can get out of order, and become defective, that when they are underground the nuisance may reach a dangerous stage before such defect can be discovered and remedied. When exposed, the house drain often shows cracks, or holes, which are, as a rule, covered up by plumbers in various ingenious ways, such as by stones, tin, rags, waste, cotton, corks and putty. The covers of the various handholes near traps are often loose, or are missing; and the air of the cellar is filled with that of the sewer. Such handholes should be ordered to be provided with brass screw ferrules.

*When service pipes* are also a source of trouble in cellars, as they are frequently defective, leak and cause dampness; especially is this the case in winter, when these and other pipes are apt to freeze and burst, flooding the cellar and its contents. There are also in the cellar the engine and pump for the pumping of water to the water tank on roof. The engine is, as a rule, in a separate compartment.

*Halls, Public Halls*—From the cellar the inspector goes up into the entrance hall. Here the points to be inspected are the construction, condition and the light and ventilation of the halls.

Painted walls and ceilings are best for the public halls of tenement houses, as they can be cleaned and kept clean, certainly with less difficulty than walls and ceilings which are papered and wainscoted. The floors of the public halls should never be of wood, as wood gets easily out of repair, gets saturated with moisture and filth and cannot be kept clean. Oilcloth and linoleum are not much better, as they cannot stand the wear and tear incident to tenement house use. The best floors for public halls are made of cement or of stone tiles; they can be washed and are always clean.

The halls get their light and ventilation from the windows, transoms over doors and from the roof. The days of dark halls are past; no more can builders construct houses with public halls without any windows to the outer air; and this improvement in tenement house hall lighting is one of the greatest merits of the Tenement House Law. In old houses, wherever halls are too dark to allow one to read in every part of them without artificial light, some means to give better light are to be provided, according to the law, and the Department may order artificial light to be kept burning in the halls the whole day through. The lighting of halls at night is of the utmost importance, although it is not done in a satisfactory manner by most owners. According to the law, not only must every hall be lighted on every

floor from sunset till 10 p. m., but in two halls, viz., the entrance hall and two flights above same, a light must be kept burning the whole night through; although this provision of the law is not as yet enforced thoroughly.

The *plumbing fixtures* in halls, besides the gas fixtures, are the sinks and water closet compartments. There are not very many houses left with public sinks in the halls. Where these are placed in halls they are a source of a great nuisance, as they are not sufficient for the needs of the two to four families on the floor and the woodwork around and near them is saturated and foul, they often overflow, and they are seldom cleaned or kept clean. According to the provisions of the law all woodwork under the sinks in halls must be removed, but the very presence of sinks in the halls is a source of nuisance.

The *water closets* placed in separate compartments in the public halls are to be carefully inspected as to their construction, character and cleanliness. There are few old pan closets left in tenement houses, as they have been assiduously ordered out by all inspectors for a number of years; but there are as yet a large number of long and short hopper closets in the halls, and these, especially the long, so-called "Philadelphia" hopper closets, are a very bad form of water closet fixture. The inspector should see whether the flush pipe is of sufficient caliber to properly flush the closet; and no flush pipe under one inch diameter should be considered by him as adequate; a one and one-quarter inch pipe being the best for the purpose. The floor and woodwork about and

around the closet are usually dirty and saturated with foul water; and spaces under the seats very filthy. Drip trays under seats and safes under the fixtures are yet to be met with, especially the former, and should not be tolerated. The condition of the water closet apartment, its light, is windows, its cleanliness, its lighting by night are to be inquired into. While inspecting the halls the inspector should pay attention to the *stairways,* their construction, condition, lighting and cleanliness. Slate and stone floors for stairways are the best, as any other material is difficult to be kept clean. The condition of the rails and banisters of the stairways must also be noted, as well as the presence or absence of a bulkhead over the stair well, and its construction and condition.

*The Rooms*—The most important part of the house has as yet not been inspected; the rooms of the house are next to engage the attention of the inspector.

The inspector should note the number of total apartments in house, number of apartments on each floor and the number of rooms in each apartment.

The size of rooms in newly constructed houses is carefully provided for by the law, but rooms in old houses may be of any size as long as the apartment does not have more persons than one adult for every 400 cubic feet and 200 cubic feet for children under 12.

The number of windows and where they lead to must be carefully noted. There are yet many old houses with no direct light, and having no windows into the outer air, their windows opening only to adjoining rooms which open into the outer air; as these rooms are mostly

used for sleeping purposes, their ventilation is thought to be of no importance. The flooring of rooms is important to the health of the tenants, but is not paid attention to as a rule. The best floor would be of narrow strips of hardwood, well joined, painted and varnished; these are, however, not frequently found in common tenement houses, being too expensive; and the floors are rickety, saturated with dirt and damp, sometimes covered with a carpet that was not cleaned for many years. The best covering for walls and ceilings in tenement house rooms is white paint, and the worst is wall paper, as it cannot be easily cleaned and is not renewed for years and is very filthy. Frequent painting of the walls and ceilings of rooms is a sanitary necessity and should be insisted upon by the authorities.

The fixtures found in rooms include the following: Gas pipes and chandeliers; water closets, sinks, laundry tubs, wash basins and bath tubs. Gas pipes should be carefully looked after, as they frequently leak and let gas escape. The water closets which may be within the apartment are to be inspected as already described when speaking of water closets in the halls. The best sinks are those of white enameled iron. All woodwork under sinks should be removed and the places beneath the sinks kept clean. The practice of many plumbers when traps of sinks are obstructed of making holes in the lead pipe and then closing them with putty and cork, or leaving the holes open is a source of nuisance, and the pipes under sinks, as well as under the other fixtures, should be carefully inspected and searched for such defects.

Laundry tubs, when of wood or of wood metal lined, are a nuisance; the only tolerable tubs are of soap stone, and the best of enameled iron or of porcelain. Bath tubs when within apartments are a great convenience and comfort to tenants, but unfortunately are not frequently used, and are mostly out of repair and used as a place for the storage of coal, rags and rubbish; such usage not only spoils the tubs, but also causes the evaporation of the water seal in the trap of the disused fixture, thus fouling the air of the rooms. The waste pipe from the bath tubs is sometimes connected either with the trap of the water closet, or with the soil pipe above the water closet trap, thus causing fouling of the bath tubs by the backflow of sewage from the water closet trap. The inspector can detect the faulty connection by letting the water in the tub run and watching the effect upon the water in the trap of the water closet adjacent to it; if the water in the water closet trap is disturbed, it shows that there is a connection from the bath tub above the trap.

Wash basins are not desirable fixtures to have, especially in bedrooms; their inspection is not different from ordinary sinks.

The only part of the house left for the inspector to examine is the *roof* and its contents, among which are the following: Roofing, eaves gutters, chimneys, extension of pipes, water tank.

The material with which the roof is covered is to be noted, as well as the condition of the roof and whether there is any leakage. The eaves gutter and its condition and its connection with the rain leader are important

facts bearing upon the dryness of the walls and ceilings of apartments of upper floors.

The *chimney* above roof should be in good condition, and the inspector is to note all defects in same, such as loose bricks, tightly fitting cowls, etc. When the one house is adjacent to a house several stories higher, the smoke from the chimney of the smaller house will enter the windows and rooms of the higher house, and this can best be remedied by a special flue leading from the chimney of the smaller house along the outside wall of the higher house and open on the roof of said higher house.

The extended plumbing pipes can be seen on the roof, and should be at least two feet above the highest coping, and not near chimneys, ventilators, etc. The open ends of extended pipes should not be covered with cowls, nor should the pipes have any what is termed "return bends," as both interfere with the escape of the foul air from the pipes; the best fixtures for the open ends of the pipes is a small wire basket used to prevent stones, etc., from being thrown into the pipes.

The water tank on the roof is to be carefully inspected as to its supports on iron beams, its condition, whether it does not leak, and when it was cleaned, as the tank is filled with a sediment of dirt if not cleaned for long periods. The overflow pipe from the tank is best left to empty upon the roof, and should never be connected with any of the pipes of the plumbing system of the house.

*Notes and Reports*—The inspector should make detailed notes on the spot, as otherwise he may forget some very

essential points. If he is furnished with printed form and cards, as, for instance, the I or the Y card (printed below), he should carefully follow the instructions and items of the card and fill in the desired information. Should there be no printed forms for notes or reports, the inspector must make his own notes and use his own language in the report, closely adhering, however, to the general phraseology used by the department. The report must be short, clear and to the point, giving the superiors of the inspector a clear idea of the existing conditions as found and the remedies as recommended by the inspector to remove the violations.

The following forms of reports and cards will partly illustrate the system adopted by the Tenement House Department:

TENEMENT HOUSE DEPARTMENT OF THE CITY OF NEW YORK.

Borough of Manhattan.

Viol.....190

Compl.....190

NEW YORK.....190

To the Tenement House Commissioner
of the City of New York.

SIR: I respectfully *report* that on.....1904,

I examined the premises and tenement house, No.....

.....

The said tenement house is a.....building .....stories and.....in height.....feet front.....feet deep, and is arranged to accommodate .....families on a floor, and..... families in the whole building.

The Owner is.....

Address.....

The Agent is.....

Address.....

I found the facts to be as follows:

(Here follow the descriptions of the conditions as found on inspection.)

.....Inspector.....Dist.

Report Reviewed.....

Approved.....Chief Inspector.

Street ..... No.....

Dist.....Borough of.....

To the Tenement House Commissioner. Sir:—

I recommend that the following orders be issued in this case:

B

STREET ..... NO. ..... WARD ..... DIST. ..... DATE .....

| ROOM | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| § 97 PERMIT ..... accessible-for " | | | | | | | |
| 1. HEIGHT of Room, floor to ceiling | | | | | | | |
| 2. MINIMUM HEIGHT of Ceiling above curb | | | | | | | |
| HEIGHT of Ceiling { above / ground } of { yard-outer court / shaft-open-25sq ft | | | | | | | |
| 4. AREA; Open-closed-grated | | | | | | | |
| " ; Along entire frontage of Room | | | | | | | |
| " ; Width | | | | | | | |
| " ; Well and effectually drained | | | | | | | |
| 5. WINDOWS; Number | | | | | | | |
| " ; Open on | | | | | | | |
| " ; Size | | | | | | | |
| " ; Area made to open | | | | | | | |
| 6. FLOOR; Wood over-earth-concrete | | | | | | | |
| LOWEST FLOOR { Basement-cellar-sub-cellar / Over marshy ground, water and damp-proof | | | | | | | |
| 7. ROOM; Has sufficient light | | | | | | | |
| " ; Dry at { A-Floor / B-Walls | | | | | | | |
| " ; Is fit for human habitation | | | | | | | |
| SINK Washtray | | | | | | | |
| 3. WATER CLOSET; Type ..... Location | | | | | | | |
| ROOMS; For janitor's apartment | | | | | | | |

DEFECTS AND REMARKS

SUMMARY

NO PERMIT. Permit not accessible

1. ROOMS not 7' high .....

2. CEILINGS not 2' above street .....

3. W. C.

4. AREA—not open. Not 2' 6" (min.) wide

" not effectually drained

" " along entire frontage of one room

5. WINDOW not 9 sq. ft in clear

" " readily opened

6. FLOOR not concreted—Not water and damp-proof
Lowest floor is over marshy ground, or water pressure

7. ROOMS ..... not sufficiently ligh
throughout 75% of area of each

8. ROOMS ..... not fit for human habitatio

37-68-06 (B) 8000

Front of Card B.

BLD'G ..... STORIES ..... FT. FRONT ..... FT. DEEP ..... AP'TS PER FLOOR ..... TOTAL AP'TS. .....
Number-Base-Cellar

OWNER ..... ADDRESS .....

AGENT ..... " .....
All statements on this card are correct

BOROUGH OF ..... INSPECTOR ..... DIST.

Back of Card B.

**B-Y**

STREET..... NO. ..... WARD..... DIST. ..... DATE .....

**BAKERY** BUILDING. Fireproof Non-Fireproof Date of Erection LOCATION Occupies Entire Part Cellar Base Front Rear North South East West Side

Height Used as egress from yard OVEN Inside Yard Street Court Hood over Separate flue

**OPENINGS INTO BUILDING** DESIGNATE BY LETTERS ON DIAGRAM Number Doors Windows Transoms Stairs Dumb-waiter shaft Elevator shaft

**CEILING** FIREPROOF I Beams FILLING Brick arches Hollow tile Concrete

NON-FIREPROOF Open Joists Sheathed Lath and plaster Metal Plaster board Plaster on metal lath

**EXPOSED POSTS** DESIGNATE BY LETTERS ON DIAGRAM Number Material Location

**EXPOSED GIRDERS** DESIGNATE BY LETTERS ON DIAGRAM Number Material Location

**FLOOR** WATER-TIGHT Dry Damp Wet Water MATERIAL Earth Wood Wood over concrete Brick Cobble Flagging Concrete Cement Asphalt Tile

**LIGHTING AND VENTILATION** ADEQUATE Light Dim Dark Black WINDOWS Number Location DESIGNATE BY LETTERS ON DIAGRAM Open on Street Yard Court Shaft

**REMARKS**

WALLS AND PARTITIONS

| Location | Diagram | Stone | Brick | Stud | Plastered | Sheathed | Metal Covered | | |
|---|---|---|---|---|---|---|---|---|---|
| Front | | | | | | | | | |
| Rear | | | | | | | | | |
| Side | | | | | | | | | |
| Side | | | | | | | | | |

**WATER CLOSETS** Number Location Separate room

Partition to ceiling

VENTILATION Open on street Yard Court Shaft

Waterproof floor Kind Base Kind of fixtures Open

**SINK** In bakery Water supplied Open Flushed

(OVER)

T&H HOUSE DEPT. FORM 1010 5040-103-M.

Front of Card B-Y.

B'LD'G. STORIES FT. FRONT FT. DEEP AP'TS. PER FLOOR TOTAL AP'TS.
Number-Base-Cellar C-B-1-2-3-4-5-6 Stores

OWNER ADDRESS

AGENT "

All statements on this card are correct

BOROUGH OF..... INSPECTOR..... DIST.

Back of Card B-Y.

F

STREET ..... No. ..... WARD ..... DIST. ..... DATE .....

BUILDING Brick-Wooden NO. OF STACKS LOCATION Front-Rear-Court REPORT INCLUDES CARDS

BALCONIES Number; Front-Rear-Court Includes windows **Includes stair halls** Width **Under 3'** Height **Under 2' 9"** Distance below sills **Over 1'** Extend beyond windows **Over 9"** Size of Landing X Head X Foot **Under 24" sq.**

PASSAGEWAY Wall Rail Width **Under 14"**

FLOOR SLATS Material Cast Wrt. X Size **Under 1½" x ⅝"** Dist. apart **Over 1¼"** Project beyond frame **Rest on Rail**

BATTENS X Size **Under 1½" x ⅝"** Dist. apart **Over 3'** Riveted

OPENINGS X Size **Under 21" x 30"** Open

TOP RAILS X Size **Under 1¾" x ⅛"** Wrt. 1½" x ¼" Angle Through wall Nuts 4" washers, ⅝" thick Size of ends **Under ¾"** Separate Riveted Two ½".

BOTTOM RAILS X Size **Under 1½" x ⅝"** Wrt. 1½" x ¼" Angle In Wall Leaded Cemented Size of ends **Under ½"** Separate Riveted Two ½"

STANDARDS Round-Square-Irregular X Size **Under ½"** Riveted Top rails Bot. Rails Frame Dist. apart **Over 6"** Braced

LANDING PLATFORM Dist. above ground **Over 10'** Stairway connection Width **Under 3'** Length **Under 4'** End railings Height 2' 9" Drop ladder

STAIRWAYS Angle **Over 60°** STEPS Width **Under 6"** Length **Under 20"** Rise **Over 9"** TREAD Open **Rod** **Double rung** Flat Cast Wrt.

X Size **Under 1½" wide** Angle irons **Under 1½" wide** Open spaces **Over ¾"** Bolted or riveted to strings

STRINGS Channels **Under 3"** Bars **Under ⅝" x 4"** Double bar **Under ¾" x 1½"** Double Angles **Under ¼" x 1½"** Braces Through wall Leaded Bolted Bolted through strings **Under 7' above floor** Strings Rest on brackets Bolted Lower Top

HAND RAILS Cast Wrt. X Size **Under ¾"** Braced

BRACKETS Cast Wrt. X Size **Under ½" x 1¾"** Angle iron X Size **Under 1¾" x ¼"** Braced Dist. apart **Over 4'** How braced **Under ¾" sq.** Wrt.

Extend from wall **Under ⅔ of width** Through wall Turned down **Under 3"** Nuts Washer X Size **Under 4" sq.** **Under ⅝" thick**

ON OLD HOUSES X Size Through wall **Under 1"** Nuts Washers **Under 5" sq.** **Under ½" thick** Separate Two rivets **Under ⅝"**

TEN. HOUSE DEPT. FORM 1003. 27-24-08-B. (OVER)

Front of Card F.

B'LD'G STORIES Number-Base-Cellar FT. FRONT FT. DEEP AP'TS PER FLOOR C-B-1-2-3-4-5-6 TOTAL AP'TS Stories

OWNER ADDRESS

AGENT

All statements on this card are correct.

BOROUGH OF VIOL INSPECTOR

LADDERS DROP Length Reaches ground Width **Under 15"** Strings **Under ½" x 2"** One piece Rungs **Under ⅝"** Apart **Over 12"** Riveted

GOOSE-NECK Length Above roof Width **Under 15"** Strings **Under ½" x 2"** One piece Rungs **Under ⅝"** Apart **Over 12"** Riveted Space to rail **Under 18"**

Fastened Wall Roof Rest on brackets **On slats**

INCUMBRANCE PLATES All balconies Missing what floors Facing windows of ap'ts X Size Raised Letters Length Prominent Painted Two Colors

PAINTING Painted Apparent number of coat **2** Character of painting

WOODEN BUILDING

BRACKETS How secured Bolts **Through studs** Screw nuts Wrt. iron plate X Size **Under 3" x ¼"** Across two studs Backed by blocking Thickness 2" How secured

TOP RAILS How secured Bolts **Through studs** Screw nuts Wrt. iron plate X Size **Under 3" x ¼"** Across two studs Backed by blocking Thickness 2" How secured

BOTTOM RAILS How secured Bolts **Through studs** Screw nuts Wrt. iron plate X Size **Under 3" x ¼"** Across two studs Backed by blocking Thickness 2" How secured

Lag screws **Under ⅝" x 4"** STAIRWAYS Rise **Over 11"** STRINGS Bar **Under ¼" x 4"**

Back of Card F.

1

STREET..... NO..... WARD..... DIST..... DATE.....

SKYLIGHT 83 Over Stairwell IN ROOF; Area glazed surf.-Size of Opening-Ridg. Vent.-Louvres; Obstructed Dome light under ADEQUATE

IN BULKHEAD; Area glazed surf.-Windows; Number Size How open Other ventilation ADEQUATE

WINDOWS IN HALL; Number Size How hung Location VENT. ADEQUATE

SCUTTLE-BULKHEAD 32 SCUTTLE; Size opening Outside; Metal cov.-Wood-Iron-Glazed Lock Needs hinging BULKHEAD; Door top of stairs-Lock Door foot of stairs-Lock

LADDER-STAIRS; Stationary-Wood-Iron-Handrail Short Accessible ADEQUATE

| SHAFTS | Length | Width | Area | Material of Walls | Starts at | Covered | Vent. Skylight | Suff. access at base 106 | By Door | By Window: Size Opening | Sill above floor of: Room | Sill above floor of: Shaft | How hung | Ladder needed |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | | | | | | | | | | | | | | |
| B | | | | | | | | | | | | | | |
| C | | | | | | | | | | | | | | |
| D | | | | | | | | | | | | | | |

FIRE ESCAPES 29-30 One each apt. LOCATION; Front-Rear-Shaft

Party wall balcony; Wall pierced where ADEQUATE

Where lacking

Egress from Yard

BALCONIES: Wood-Iron-None RAILINGS; Wood-Iron

FLOORS; Wood-Iron STAIRS; Wood-Iron-Open tread-Solid tread

LADDERS; Vert.-Inclined-Double rung-Hand rail-Missing what floors-Drop ladder needed

| WINDOWS | J | K | L | M | N | O | P | Q | R | S | T |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Width | | | | | | | | | | | |
| Height | | | | | | | | | | | |
| Dist. below ceil. | | | | | | | | | | | |
| How hung | | | | | | | | | | | |

| FIXTURES | Number per Floor: Cellar | Base | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|
| SINKS IN HALLS | | | | | | | | |
| Wood encased 99 | | | | | | | | |
| WATER CLOSETS In Halls (Pan.) | | | | | | | | |
| In Apts. (Pan.) | | | | | | | | |
| Wood Risers 98 | | | | | | | | |

YARD FIXTURES 100 School sink-Latrine-Privy vault-Water closets; Number Compart. (Sewer in street)

CLOSET ACCOM. 100 No. in Yard-Cellar-Apts.-Stores-Total Used by Families; In Bldg.-Other Bldgs.-Stores-Total

REMARKS Ratio; 1 W. C. to.....families

SEN. HOUSE DEPT. FORM 1040 4888-100-M.

Front of Card I.

B'LD'G. STORIES Number-Base-Cellar FT. FRONT FT. DEEP AP'TS. PER FLOOR C-B- 1 - 2 - 3 - 4 - 5 - 6 Stores TOTAL AP'TS.

OWNER ADDRESS

AGENT "

All statements on this card are correct.

BOROUGH OF INSPECTOR DIST.

PAINT-OIL-LIQ.-DRUGS 42 No. Doors to Halls; Fireproof No. Windows to Halls-Transoms: Wire glass-closed BAKERY 41 Fire proof Ceiling-Walls Openings to Bldg.: Doors-Windows-Transoms-Shafts-Stairways.

INTERIOR ROOMS 79 No. per floor; Base - 1 - 2 - 3 - 4 - 5 - 6 Windows above adjoining building possible at what floors Windows into shafts and yards on lot line possible at what floors.

Back of Card I.

U

STREET..... NO..... WARD..... DIST..... DATE.....

**ROOF**
103 Rubbish Cleanliness Fecal Location of leaks

**WATER SUPPLY**
104 Not adequate, what floors Roof tank

**FLUSHING APP.**
ADEQUATE Not adequate where

**CAST IRON PIPES**
Openings noted

**LEAD PIPES**
Defects Openings noted

**FIXTURES**
Defective

Extremely foul; where located

| HALLS AND STAIRS | FLOORS | | | WALLS | | | CEILINGS | | STAIRS | | Cleanliness of Woodwork |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Rubbish | Clean. | Covering | Clean. | Needs P. or W. | Old Paper | Clean. | Needs P. or W. | Rubbish | Clean. | |
| Outside | | | | | | | | | | | |
| Cellar | | | | | | | | | | | |
| Base | | | | | | | | | | | |
| 1 | | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |

Ten. House Dept. Form 1009—04, 34-86-04—E.

| HALL LIGHT'G 80 ADEQ'TE | Wooden panels in doors at end of Halls | WINDOWS FROM HALLS | | | | | |
|---|---|---|---|---|---|---|---|
| | | At end to Outer Air | To Shaft | To Outside Rooms (5 Sq. Ft.) | | To Interior Rooms | |
| | | | | At End | At Side | At End | At Side |
| B | | | | | | | |
| 1 | | | | | | | |
| 2 | | | | | | | |
| 3 | | | | | | | |
| 4 | | | | | | | |
| 5 | | | | | | | |

Hour Weather

| UNOCCUPIED SPACES | Rubbish | Clean. | Remarks |
|---|---|---|---|
| | | | |

Front of Card U.

BLD'G. STORIES FT. FRONT FT. DEEP AP'TS. PER FLOOR TOTAL AP'TS.
Number-Base-Cellar C-B - 1 - 2 - 3 - 4 - 5 - 6 Stories

OWNER ADDRESS

AGENT "

All statements on this card are correct

BOROUGH OF ..... INSPECTOR..... DIST.

GARBAGE CANS 109 Suitable Number Material Condition Where kept ADEQUATE

ASH CANS 109 Suitable Number Material Condition Where kept ADEQUATE

HOUSE DRAIN Obstructed-Free Openings noted Line and grade Supports needed

LOWEST FLOOR 101 Sub cellar-Cellar-Base Air space under; Height-Accessible-How ventilated CEILING, Plastered-Joist-Sheathed-Fire proof-Needs paint or white wash

FLOOR; Watertight-Earth-Wood-Wood over concrete-Brick-Cobble-Flagging-Concrete-Asphalt-Defective Dry-Damp-Wet-Water Cleanliness

WATER CLOSET COMPART. IN BLDG. Rubbish Repair Needs B Card

YARD FIXTURE COMPARTMENTS Rubbish Cleanliness Fecal

SCHOOL SINK Rubbish Cleanliness Fecal

VAULT CESSPOOL

Needs flushing How full Repair

OUT BUILDINGS Rubbish

DISINFECTION NEEDED

SATURATED WOODWORK Where located

GENERAL REMARKS

NOTES: Rubbish; Free-Some-Much Repair; Good-Fair-Bad Cleanliness; Very clean-100, Clean-80, Somewhat dirty-60, Dirty-40, Very dirty-20, Filthy-0

Back of Card U.

# CHAPTER VII.

## CIVIL SERVICE EXAMINATIONS.

The purpose of Civil Service competitive examinations is the selection of officials for the public service according to their personal merit and their special fitness for the discharge of the specific duties of the various offices they seek to hold.

In order to determine the fitness of persons desirous of entering the public service and their competence to properly perform their duties the civil authorities impose upon the candidates for public offices competitive examinations so conducted as to best discover and gauge the respective merits of each competitor, giving the appointment to the one or ones standing the highest on the list.

Although experience has amply shown that it is not always the one who succeeds in reaching the highest position in the competitive list that is the most competent and successful in the performance of his duties, and that mere ability to answer Civil Service examination questions is by far not the only criterion of the character and ability of a person, it is nevertheless true that competitive examinations have given a fairly competent staff of civil employees and a large proportion of decent public officials.

## SECURE TENURE OF OFFICE.

There are two basic principles without which Civil

Service is but an empty word. There are (1) secure tenure of office and (2) proper compensation and recognition of length of service. Unless the public official is assured of a secure tenure of office as long as he faithfully performs his duties, and unless he is insured against the vicissitudes of frequent political party upheavals, no good public service is possible. No matter what changes there may be in the personnel of the higher officials of departments, the inspector and the public official generally should be certain of his position during good behavior. A permanent tenure of office should also imply a pension for length of service and disability. This has been already conceded by a great number of private corporations, and there is no reason why public officials should not get an adequate pension after they have given the best part of their lives to the service of the State or city. The State has no right to the exclusive use of the best part of a man's life without securing for its employee some protection in his old age.

## PROPER COMPENSATION.

No competent and faithful service can be expected by the State, or by any private corporation unless their servants are amply and properly compensated. Whenever the compensation of a position is inadequate the results are a poor quality of employees, as those with higher abilities and greater ambition will naturally seek better paying positions; a dishonest service, as the public official may not be able to withstand the temptations so

often befalling him: a frequently changing personnel, as every poorly paid official will naturally try to get out of it and look for something better.

The interest of the State surely suffers when public service is underpaid and it suffers also when length of service of public employees is not taken into consideration. The public officer should have his income from office increased as he grows older in the service, such increase serving as a recognition of faithful service as well as an incentive to better efforts, and a recompense for his increased skill and efficiency.

## POINTS DETERMINED BY COMPETITIVE EXAMINATIONS.

There are three principal points which are sought to be determined in the competitive examinations. These are: First, the moral fitness of the candidate. This is determined by the affidavit of the candidate as to his past life and the vouchers of four reputable citizens as to his moral character. The second point is the average intelligence and general education of the candidate. These are determined by the examination in spelling, arithmetic and the questions bearing on the general intelligence of the candidate. The third point determined in the competitive examination is the special fitness of the candidate for the special position he seeks, and his competence in this respect is found out in the answers to the so-called "technical paper," or questions bearing directly upon the duties and subjects with which the candidate will have to deal after his appointment.

## REQUIREMENTS FOR POSITIONS IN THE TENEMENT HOUSE DEPARTMENT.

The positions in the Tenement House Department of the city of New York are subject to the same Civil Service rules and regulations governing other municipal departments, and all candidates for clerkships and inspectorships in the department are required to pass a competitve examination upon the following subjects:

For clerkships: Arithmetic, handwriting, spelling and dictation, and technical.

For inspectorships: Handwriting, arithmetic and technical.

For either position there is an additional test—that of "experience." The relative importance of each subject is as follows: Taking 100 as the standard, arithmetic counts 10 per cent., handwriting 10 per cent., experience 20 per cent. and technical subjects 60 per cent.

The scope of examination in arithmetic consists in the knowledge of the rudiments of arithmetic, also mensuration and calculation of areas, as the inspector is required in the performance of his duties to measure lots, houses, rooms, etc., and should have the theoretical knowledge needed for these duties.

Legibility is the most important point in handwriting.

Experience in house inspection and a previous study and practical acquaintance with tenement house conditions and methods of inspection is a very important element of the examination and is given the relative weight of 20 per cent.

The scope of the technical examination is subdivided as follows:

1. Tenement House Law. An intimate knowledge of the provisions and sections of the Tenement House Act is absolutely required, and most of the questions in the "technical paper" bear upon the law.

2. Plumbing and Sanitation. A theoretical knowledge of plumbing and the few sections of the sanitary code relating to the cleanliness in tenment houses are also necessary for the inspector, and the technical paper usually contains four or five questions on these subjects. No questions have been given during the first two years of the existence of the Tenement House Department upon ventilation or construction, but some knowledge of these subjects is beneficial, and may prevent unpleasant surprise at future examinations.

3. Plan Reading. In the examination hitherto given to candidates for clerkships and inspectorships in the Tenement House Department two questions (out of a total of 15) were given on plan reading; i. e., a drawing was given representing a floor plan of a house with various dimensions in figures, the candidates being required to state if such plan is according to the provisions of the Tenement House Act or not.

*Note*—The relative weights and points given may vary with each examination.

## CONDUCT DURING EXAMINATIONS.

The following hints, advice and rules of conduct to

candidates for Civil Service examinations will, I trust, be of benefit to them:

Carefully read over the questions, study them and try to understand their meaning before beginning your answers.

Select the least difficult questions and answer them first, leaving the more difficult for the last.

Answer each question on a separate sheet of paper, so that you may be able to correct it later, or rewrite it entirely in case you find later that the answer is unsatisfactory and you have ample time.

Study each question separately, be sure you understand its purport, arrange it according to its subdivisions and answer according to these. A failure to fully understand the question and to answer it according to its subdivisions is the cause of a great many failures in passing the examination.

Answer each question briefly, concisely, clearly, and confine yourself strictly to the question.

When a definition is required, give nothing else but a brief definition, while, when a statement or description is asked for, give all the points bearing on the subject asked.

Avoid extraneous matter; do not go into other subjects, but into the ones you are questioned about.

After completing the answers to all questions, and if your time limit is not out, carefully read over your answers to each question and correct, add, and, in case of necessity, rewrite unsatisfactorily answered questions.

Be liberal with your paper sheets; use separate

sheets for every question, separate parts and new lines for parts and subdivisions of questions.

Write clearly and legibly and do not use any unnecessary technical terms, foreign words and obscure expressions.

Attend strictly to your own business; be deaf and dumb to the squirmings, appeals and questions of your fellow sufferers.

Follow the rules and regulations given to you by the examiners.

Do not be nervous or fidgety, do not be in too great hurry to be through with the ordeal, and give yourself full time to the business before you.

Do not over-study your subject, learn the most essential points needed, and do not spend the night before the examination in cramming the subject by heart, but try to enjoy a good night's sleep so as to be in a sound physical condition for the day of examination.

MUNICIPAL CIVIL SERVICE COMMISSION, NEW YORK. INSTRUCTIONS TO CANDIDATES FOR THE POSITION OF INSPECTOR.

Read the following carefully before beginning work. Candidates will be bound by these directions. Candidates are particularly warned that they must not, on any consideration, communicate, by word or sign, or in any other way with any other candidate, so long as they remain in the examination room. The slightest violation of this rule, no matter what, will disqualify the offender. No excuse will be accepted.

Candidates will be required to obtain 70 per cent. in order to be placed on the eligible list.

Each candidate should make sure that he receives all papers in their proper order.

The number in blue on your Preparatory Sheet is your *examination number;* it must be written on every paper that you hand in, and it is the only number so to be written.

1. Put your *examination* number on the Notice to Appear that you showed on entering the room. Pay no attention to the *application* number; it is *not* to be written on any paper.

2. Answer the questions on the Preliminary Sheet in the blanks opposite them. Vouchers' *first* names and addresses need not be given.

3. Inclose both the *preliminary sheet* and the *notice to appear* in the envelope, seal the envelope and fill out all the blanks on the back.

4. Do not put your name on any other papers than those sealed up in the envelope. Papers that reveal the identity of the candidates are not rated.

5. Fill out all the blanks on every paper that you hand in. On the question sheet put your *examination number,* and *nothing else.*

6. Questions must not be copied.

7. The answers to all questions must be written in ink on ruled sheets.

8. Write on one side only of each sheet.

9. Candidates must not use memoranda, pads, or any paper not provided by the Commission.

10. Any attempt to copy the papers of other candidates will disqualify the offender.

11. For information, stationery, etc., apply to the examiners only.

12. Candidates will be given an opportunity of leaving the room after handing in the first paper, but not at other times. No candidate may leave the room while engaged on a question sheet, nor at any time without the consent of an examiner.

13. The examination will close at 4 p. m.

14. All appeals must be made within 15 days after the receipt of the result of the examination.

15. No excuse or explanation will be accepted for the violation of any part of the foregoing instructions; the penalty upon the first offense is immediate dismissal from the examination.

## ARITHMETIC AND MENSURATION.

Candidates for the positions of Inspector as well as Clerk in the Tenement House Department must pass a Civil Service examination in Arithmetic, which includes, besides the rudimentary part of the subject, also mensuration. The inspector must at times in the performance of his duties measure lots, houses, rooms, etc., in order to determine their area or cubic space, and he should be familiar with the fundamental principles of the subject. The questions on arithmetic which were given in previous examinations and which will be found in another part of this book, will show the scope of the work and the problems the candidate is expected to solve.

The following rules in mensuration should be well studied and digested by students and will be helpful to them for the examination as well as for the subsequent proper performance of their duties:

The *floor space* of a room is the width of the room multiplied by its length.

The *cubic space* of a square or rectangular room is the width multiplied by the length, and the result again multiplied by the height.

The *area of a triangle* will be the base multiplied by one-half the height, or the height multiplied by one-half the base.

The *area of a circle* equals the square of the diameter multiplied by 0.7854.

The *area of a trapezoid* (in which two sides only are

parallel) equals the mean length of the parallel sides multiplied by the perpendicular distance between them.

The *cubic contents* of a room or other place are arrived at by multiplying the area of the base by the perpendicular height when the latter is uniform over the whole area. If the contrary is the case, the mean, or average, height must be ascertained and the area multiplied by it.

Projections of chimneys, offsets and solid furniture must be measured and their cubic contents deducted from the cubic space of the room; on the other hand, bay-window space, or other additional spaces must be added to the cubic space of the room.

A grown person occupies three cubic feet of space.

The minimum space allowed in rooms of tenement houses is 400 cubic feet for adults and 200 cubic feet for children under 12.

# CHAPTER VIII.

## CIVIL SERVICE EXAMINATION QUESTIONS.

The following examination papers have been given to candidates for the several positions in the Tenement House Department during the last eight years of its existence. A study of these papers will assist the candidate in his work of preparation:

### *PAPER I.*

### INSPECTOR OF TENEMENTS.

### TECHNICAL.

1. State clearly, concisely and precisely the conditions of living in New York City which have made necessary the establishment of a separate Tenement House Department.

2. Suppose a fashionable apartment house, five stories high, with two apartments on each floor. There are no kitchens in any apartment, but there is a restaurant on the ground floor. Some of the tenants introduce gas ranges into their apartments. Does this action make a tenement house of the place or not? Give reasons with your answer.

3. Explain the meaning of the words "superficial area" in the provision that "the total window area in each room, except water closet compartments and bathroom shall be at least one-tenth of the superficial area of the room."

4. State for what purposes (a) a tenement house or a part thereof may not be used for business or storage; (b) for what it may be used under certain restrictions; (c) what these restrictions are; (d) what is "wire glass" and "fireproof material" as applied to walls and ceilings?

5. Define "cellar" and "basement" and state as precisely as you can all the purposes to which the law allows them to be put and under what conditions.

6. State the laws governing fire escapes; how they must be constructed; where placed; whose duty it is, apart from the tenants, to see that they are kept clear and in good condition.

7. What is meant by a "trap" in plumbing? Why is a trap necessary in a water closet? What is the provision of the Sanitary Code as to trapping sinks, etc.? What is meant by "siphoning," how is it caused, and how best prevented?

8. What are the duties of an owner or tenant with reference to the sidewalk upon the premises of which he is owner or tenant? State one instance in which the law governing this matter has been conspicuously disregarded in the past few weeks. Upon what city department does the responsibility of this matter rest?

9. State the reasons why a water closet flush should not come directly from the supply pipe.

10. Taking in order, tubs, drains, ventilation pipes: State the best materials for each and indicate the objections to other materials sometimes used.

11. State as concisely as possible the conditions in existing tenement houses (a) which are allowed to con-

tinue; (b) which must be changed in case of alteration; (c) which must be changed if not altered; (d) which will not be allowed in houses to be hereafter erected; and give briefly your opinion for the reason of the law in each case.

12. You are sent to inspect (a) a tenement house of ordinary character, five years old; (b) a tenement house in process of construction; (c) a tenement house of the so-called "model" character, one year old; state precisely to what points you would direct your investigations, and assume any facts you please; write a report of your inspection, addressed to the commissioner. N. B. —Sign this report with your examination number and not your name.

13. Suppose that in case (a) of question 12 you discovered some conditions or violations of the law, not of a very serious character, but created by the tenants themselves. What would be your course toward the tenants? Would your course be in any way determined by any of the following: Nationality; length of residence in the city; means of subsistence; comparative ignorance? If so, how and why?

## *PAPER II.*

### INSPECTOR OF TENEMENTS.

### SPECIAL PAPER.

1. Enumerate the evils which are likely to arise from overcrowding in tenement houses.

2. Suppose a fashionable apartment house, five

stories high, with two apartments on each floor. There are no kitchens in any apartment, but the occupants take their meals in a restaurant on the ground floor. In the summer the restaurant is closed for several months for repairs. Some of the tenants then prepare their own breakfasts in their apartments. Does this action make a tenement house of the place or not? Give reasons with your answer.

3. Explain the meaning of the following terms: "Gooseneck ladder," "winder," "string" in stairways, "louvre."

4. State the principal changes made in the Tenement House Law by the amending act of 1902.

5. Under what conditions may a cellar be occupied for living purposes?

6. What is the provision of the law as to stairways in non-fireproof tenements to be hereafter erected?

7. If in making an inspection you should find tenants beating a carpet on a roof or hanging it out of windows, what would you do?

8. What are the requirements as to lighting public halls in tenement? (This question refers both to windows and artificial lighting.)

9. In what way is the height of a tenement house determined by the width of the street on which it is built?

10. Why is it forbidden to connect the waste pipe from a bathtub with a water closet trap?

11. Why is it required that plumbing work under water closets should be uncovered?

12. You are sent to inspect three tenement houses of different character. In some instances violations of the law as to construction, and in some violations of the sanitary code. Assuming such facts as you please, write a report, addressed to the Commissioner.

## ARITHMETIC.

1. A corner lot extends 92 feet on one street and 45 feet on the other. The streets are at right angles to each other, and the side parallel to the 92 feet side measures 84 feet. How many square feet are there in the ground floor of a house which covers 87 per cent. of the above lot?

2. Multiply 300.75 by 9.2046.

3. Divide 12,835865 by 629.5.

4. A lot whose front is 240 feet and whose depth is 100 feet is bought by A, B, and C, who pay, respectively $3,000, $4,000, and $5,000. To how many feet front is each entitled if it be divided in proportion to their investments?

# *PAPER III.*

## INSPECTOR OF TENEMENTS.

## TECHNICAL.

1. What evils, sanitary or moral, have existed in the past, not reached by previous city departments, which the Department of Tenement Houses is expected to cor-

rect? Answer this question completely, but concisely.

2. Give your opinion as to what makes the difference (a) in general language, (b) in legal terms, between an apartment house and a tenement house.

3. Explain, so that an ordinary person can understand, the meaning of the following requirements of the Tenement House Law concerning fire escapes: "The platforms or balconies shall be constructed and erected to safely sustain in all their parts a safe load at a ratio of four to one of not less than eighty pounds per square foot of surface."

4. What are the restrictions with reference to bakeries in tenement houses? What do you understand to be the meaning of "fireproof materials" in connection with such restrictions? What are the "other dangerous businesses" as to which there are restrictions, and what is the meaning of the technical term used in the law with reference to them?

5. State clearly the difference between a court and a yard, and also the difference between a cellar and a basement.

6. The law provides that stairways on a fire escape shall be placed "at an angle of not more than sixty degrees." From what line is this angle determined? Define the following words used in the same connection: "Goose-neck ladder," "battens," "clear headway," tread," "string," "bracket."

7. Suppose an apartment with a kitchen sink, a water closet and a wash basin. How many traps are necessary? State reasons for your answer. What, if any,

differences in the plumbing arrangements would be necessary if the apartment were supplied with water from the street or from a roof tank?

8. State the rules or ordinances concerning the location and condition of fire escapes. If fire escapes are used as storage rooms, or as places for keeping flowers or the like, whose duty is it, apart from the Tenement House Inspector's, to see that they are kept clear? If you saw such a case, what would you do?

9. What objection is there to inclosing plumbing fixtures with woodwork? In the City of Paris all gas pipes must be exposed. Do you consider this a reasonable rule or not? Give reasons with your answer.

10. Taking the ordinary tenement house, state what materials you consider best for the following named purposes: Leaders, tubs, floors, partitions where there are windows and the windows themselves, drains, and give, in each case, your reasons.

11. State clearly, the distinction made in the application of the Tenement House Law between houses already erected and those to be hereafter erected.

12. Draw up what you consider to be a proper blank form of report for a Tenement House Inspector, and, assuming three different buildings and conditions, make out a full report in each case.

13. How often do you think an inspection should be made? Would the character of the tenants make any difference in this matter? Would the particular points to which your inspection was directed be determined in any way by consideration of nationality, length of resi-

dence, means of subsistence or similar considerations? If so, state clearly how and why.

## *PAPER IV.*

### TENEMENT INSPECTOR.

### TECHNICAL.

1. Name the bureaus of the Tenement House Department, and state in a general way the difference in the duties of inspector attached to the different bureaus.

2. (a) If the owner of a private dwelling desired to add a story to or otherwise enlarge it for the use of his family, where would plans have to be filed and permission obtained to make the alterations? (b) In case the owner desired to alter the building to make it accommodate four families, what different steps must he take?

3. State the difference between yard and court as used in the Building Code; also between cellar and basement, and under what conditions may a cellar be occupied for living purposes?

4. What is the rule as to the height of a new tenement house under the present law and how are height, length and breadth of such a building measured?

5. State fully the requirements as to windows in rooms under the Tenement House Law. What window area would be necessary in a room thirteen feet long, fifteen feet wide and nine feet high?

6. What is an "intake" and what is its object? What area must the intake have for a court thirteen feet by twenty-six feet?

7. What are the special advantages of so-called

"open plumbing"? Would it be well, in your opinion, to extend the requirements of the law to gas piping? Give reasons for your answer.

8. To what extent has the requirement as to inner courts been changed by recent amendments of the Tenement House Law? Give minimum measurements of such courts under the original law, and as changed by amendment.

9. What advantage is gained by requiring careful registration of agents and owners of tenement houses? How may an owner or agent be considered to have permitted the use of tenement propery for illegal purposes in spite of his denial of the same?

10. State clearly the distinctions made in applying the Tenement House Law to buildings already erected and those hereafter to be erected.

11. Under what conditions, if at all, may a tenement house be erected on the rear of a lot on the front of which lot there is already a tenement house standing?

12. Define a fireproof building, according to the requirements of the present Building Code of New York City. What is meant by skeleton construction, and when must a tenement house be made fireproof?

13. Make a full report of your inspection of three tenement houses, assuming such conditions must be assumed in each case.

14 and 15. It is proposed to erect a tenement house fifty-seven feet high with the dimensions shown on the plan below. State whether this is lawful or not. Give reasons clearly for opinions. The lot is an interior lot.

## *PAPER V.*

### INSPECTOR OF LIGHT AND VENTILATION.

1. There are certain natural forces acting to produce ventilation in buildings; what are they? (Note: This does not refer to windows, ducts, courts, shafts, etc., which are only helps to ventilation.)

2. (a) Define what you mean by ventilation. (b) Can you have proper ventilation without light? Give your reasons.

3. (a) State what must be the cubical contents of an apartment for every person occupying the same. (b) What do you understand by an apartment? (c) State the minimum dimensions allowed for a bedroom in a tenement yet to be built. (d) State the same in an existing tenement.

4. State the difference between 7 square feet and 9 feet square, and show how you obtain it.

5. (a) Would the light radiating from a point be more intense or less intense as you move from it? (b) State the law governing the relative intensity of a light at two differing distances from the light.

6. (a) Is the purity of the air in a room dependent upon the size of the room or the amount of fresh air entering it? State which. (b) If the latter, about how much air should be supplied per minute for each individual occupying the room?

7. (a) State fully and clearly the arrangement and exact dimensions required of a window in an existing tenement. (b) State the law governing the size and ar-

rangement, and the minimum size allowed in tenements yet to be built. (c) State how windows must be measured. (d) State what the windows of every room in a new tenement must open upon. How does this differ from that for tenements now existing?

8. (a) Give an exact definition of the outer courts of a tenement and their sizes. (b) Give an exact definition of the inner courts of a tenement and their sizes. (c) Why were the narrow courts previously in use not considered of sufficient size?

9. What provisions are made in the new law for the ventilation and cleanliness of shafts and courts? State fully.

10. A room is 13 ft. 10 in. long and 9 ft. 6 in. wide. It has one window 2 ft. 10 in. wide. How high must the window be to conform to the law for new tenements?

11. (a) A street is 70 feet wide. How high may a new tenement facing upon it be built? (b) State exactly how and where this height must be measured.

12. The law requires for every tenement on an interior lot, a certain amount of vacant space not built upon; is this space the same in area as a yard, or of what is it constituted?

13. (a) How many kinds of shafts are provided for in new tenements? (b) Which of these, if any, may be covered, and under what restrictions?

14. (a) What must be the minimum area and least dimensions of a vent-shaft in a new tenement 48 feet high? (b) What must be the minimum size and area for a vent-shaft in an existing tenement, and under what

conditions may this be reduced? (c) What rooms may have windows opening into vent-shafts?

ARITHMETIC.

1. There is a square lot of land 150 feet to the side. On the sides of the lot there is a house 28 feet deep in the form of a hollow square, leaving a square court in the center. What percentage of the area of the lot is the area of the court?

2. Multiply 70.684 by 89.06.

3. Divide 28.7422542 by 472.89.

4. A is 45 years old. B is older than A by 12 per cent. of A's age. Find B's age, and express the difference of their ages as a percentage of B's age.

## *PAPER VI.*

INSPECTOR OF PLUMBING, LIGHT AND VENTILATION.

TECHNICAL.

1. (a) Give the rules governing the open space required on every lot occupied by a tenement house. (b) Define what constitutes a tenement house and also a lodging house.

2. Give the rules governing the light and ventilation of every sleeping room.

3. (a) Is there any difference between the expression "three feet square" and "three square feet," and if so, what is it? (b) What do you mean by percentage in the expression 65 per cent. of a lot surface?

4. (a) What is the least area allowed in all shafts

and courts? (b) Under what conditions may such shafts be covered? (c) How must all halls be ventilated?

5. What are the least cubical contents allowed in sleeping rooms?

6. Name, without describing them, all the pipes in a system of plumbing in a tenement house, giving them in order from the top of the building to the connection with the sewer.

7. State all the ways in which such a system, when thoroughly good as put in, may afterward be damaged, either during construction of the building or at a later period.

8. Describe a thoroughly "good drain," including in your description everything which must be done to prevent leakage and stoppage, and to make it durable and efficient in every way.

9 and 10 (a) Describe the "vent pipe" in a tenement. (b) State where the branches should be attached at each closet and the other requirements for making the branches effective. (c) State where the vent should be attached to the soil pipe at the upper end (if it is so attached), where at the lower end, the method of such attachment, and all the requirements of a good job.

11. Describe the fresh-air pipe, including the proper terminations to make it most effective.

12. State, as far as you can, all the methods pursued by dishonest workmen or employers in "scamping" work.

13. Describe the best method of testing a system of plumbing; give full details.

14. What constitutes a good and sufficient flushing system to a water closet?

15. (a) Describe a "soil pipe" in a large tenement. (b) How it should be supported. (c) How it should be terminated at the top. (d) How it should be attached to the house drain.

## *PAPER VII.*

### LAY SANITARY INSPECTOR (ALSO TENEMENT HOUSE INSPECTOR).

1. (a) What kind of tenements must be fire-proof? (b) What are the most common fire-proof materials? (c) Describe how these materials are used in—(a) floor construction, (b) partitions, (c) the casing of posts, girders and trusses.

2. (a) Where and how must concrete be used in tenement-house construction? (b) What constitutes good concrete? (c) Describe one way of making it.

3. (a) What are the provisions of the Tenement-House Act in reference to windows in living rooms of tenements for purposes of light and ventilation? (b) What is wire-glass and for what is it chiefly used? (c) Name 2 parts of a tenement which must be painted light color, give reasons?

4. (a) What are the principal objections to earthenware house drains? (b) Under what conditions may one house drain be connected to 2 houses? (c) In what ways must openings in pipes be closed after removal of fixtures? (d) In setting cast-iron drain pipes, it is discovered that several have blow-holes. In what manner and under what restrictions may such holes be plugged?

5. (a) How must joints in iron drain pipes be connected? (b) How must connections of iron pipes be made with lead pipes? (c) How must connections of lead waste pipes be made? (d) In a bath-room it is proposed to place a trap 3 feet away from a water closet that it may be connected with the waste pipe from a bath-tub. State whether this is is permissible, giving your reasons.

6. What is the remedy in each of the following cases: (a) A tenant in an apartment house is annoyed by odors from garbage and stagnant water in an adjoining vacant lot. (b) The noise of machinery in a printing shop disturbs the rest of tenants in adjacent houses.

7. (a) How would you test a trap with a view of finding out whether its seal is lost or not? (b) How should the scent, or peppermint test be made?

8. (a) Give briefly the provisions of the tenement law in regard to rails of fire-escapes. (b) What is meant by "filling-in-bars" or "standards;" by "angle-iron," by "cast-iron."

9. (a) Compare from a sanitary standpoint a long with a short hopper closet. (b) Give provisions of Tenement Law as to removal of school sinks.

10. A complaint has been made to the Tenement-House Department that the water supply in a certain tenement house is inadequate. You are sent to investigate matter. Assuming such facts as you please, make a detailed report of the result of your investigation, give all the essential particulars and make such recommendations as you deem necessary.

## *PAPER VIII.*

### LAY SANITARY AND TENEMENT INSPECTORS.

1. (a) In what manner must the stair-halls of tenements 4 stories in height be enclosed? (b) What may be the construction if the tenement does not exceed 3? (c) What is the composition of mortar for building purposes? (d) What is metal lath?

2. What are the essential points of differences between brick and terra-cotta as regards composition, methods of manufacture, uses and durability?

3. (a) How would you determine when it is necessary to use damp-proofing in tenement construction? (b) Mention the materials most commonly used in damp-proofing and prescribe the way in which they are used.

4 and 5. Explain briefly but clearly the functions of each of following: (a) house drains; (b) running traps; (c) soil pipes; (d) vent pipes; (e) main waste pipes; (f) rain leaders; (g) fresh air inlet; (h) house seal.

6. Name five different conditions which would make a house uninhabitable during alterations and necessitate the issuance of a vacation notice by the Department.

7. (a) In what way must the waste pipes of tenements be ventilated? (b) How may an attempt be made by plumbers to avoid complying with this regulation? (c) What test may be made to see that the law is complied with in this respect and how is it applied?

8. (a) What are the most common causes of escape of sewer air in tenement? (b) How can these be remedied? (c) What is siphonage? How caused? How prevented?

9. (a) Name five kinds of wood most commonly used in tenements. (b) What is the cause of "dry-rot" in woodwork, and in what part of tenement does it usually occur? (c) What recommendations would you make under such conditions?

10. (a) Draw a rough sketch of a properly constructed water closet to be erected in the yard of a tenement house. (b) Name the three materials which may be used for water proofing the floor of this closet, giving a brief description of each.

## *ANSWERS TO QUESTIONS GIVEN IN FORMER CIVIL SERVICE EXAMINATIONS FOR THE POSITIONS OF TENEMENT INSPECTOR, SANITARY INSPECTOR, ETC.*

NOTE.—In the following pages an attempt is made to give answers to a large number of questions given in former examinations. The answers are more or less accurate, although no infallibility is claimed for them; they are given as the author would have answered them were he at those examinations. Most of the questions are quite reasonable and tend to test the candidate's technical knowledge as well as his common sense. There are, however, a few questions which, with all due respect to the examiners and those who framed the questions, are absurd, or, at least, unjust, in that they are either too difficult and embrace too large a field, or are otherwise unintelligible. I have taken the liberty to point out such questions, and have made no attempt to answer them. As it would be superfluous to repeat one's self, I have referred the answers to certain questions to paragraphs and sections in text of book and Tenement House law.

### *ANSWERS TO PAPER I.*

*Question* 1. The conditions in New York City which have made necessary the establishment of a separate Tenement-House Department were, (1) the extreme unsanitary manner in which most of the tenement houses were kept, (2) the fact that 75 per cent of all the population of the city lived in tenement houses, (3) the fact that there were over 300,000 dark rooms in these houses, and several thousands of school sinks and some privy-vaults, and (4) the fact that it was utterly impossible for a sub-division of the

Health Department to cope with the situation, and such a large portion of the population deserved and demanded a special department to take care of it.

*Question* 2. It would depend as to how many tenants introduce the ranges into their apartments and whether permanently or temporarily. If three families do their cooking *separately* and *independently* of each other it would constitute a tenement house, otherwise not.

*Question* 3. By "superficial area" is meant the floor area of the room, i. e. the width multiplied by the length.

*Question* 4. See Law sections 39, 40, 41.

"Wire-glass" is a glass in which wire is embedded. For definition of fire-proof material, see Law section 9.

*Question* 5. Definition of cellar and basement, see section 2.

The law allows them to be used for bakeries and for living purposes.

The conditions for permission of their use for bakeries are that the ceilings should be protected with fire-proof material.

For conditions of living in cellars and basements, see Law sections 90-95.

*Question* 6. See Law section 16.

It is the owner's duty to keep the fire-escape clear and in good condition.

*Question* 7. A trap is "a bend in a pipe so constructed as to hold a certain amount of water."

A trap is necessary in a water closet to prevent the sewer air from the pipes from coming into the rooms through the fixture and pipe.

The provision of the Sanitary Code as to trapping sinks, etc., are (1) that all sinks, etc., be trapped separately, (2) that the trap be as near the fixture as possible, not further than 2 feet from same, (3) that the trap be set level and be provided with screw cap, or other means for cleaning it in case it is obstructed.

For "siphoning, causes and prevention," see Chapter V, sections 9 and 11.

*Question* 8. He has to keep it in good repair and clean.

The snow was not removed from sidewalks.

The Police Department.

*Question* 9. The reason why a water closet should not be flushed directly from the supply pipe is that there is danger of contaminating the water supply from the sewage in the water closet, besides, it is difficult to empty the contents of a water closet by the force of the water jet of an ordinary pipe.

*Question* 10. *Tubs*,. best material is porcelain, next enameled iron. Wood is bad because it gets foul and saturated.

*Drains*—the best material is extra heavy cast iron. Earthen-ware is bad because it breaks very easily and it is difficult to join properly.

Ventilation pipes—cast iron.

*Question* 11. NOTE—This is one of the unfair questions: it is vague, it requires the quotation of the whole law for its full answer, and it is impossible to adequately answer it. What are, for instance, the conditions which are "allowed to be continued?"—Everything is allowed to continue, except such conditions as are expressly prohibited.

*Question* 12. (a) In a tenement of ordinary character five years old, I would pay attention to the defects in construction, defects in condition, defects in light, ventilation and plumbing and to the cleanliness of premises.

(b) The points to which I would direct my attention in "a house in process of construction" would be the compliance with the plans and specifications, the leaving of proper spaces for yards, courts, etc., and the conformations of the builders with all the sections of the Tenement and Building regulations.

(c) In a house of so-called model character one year old, I would mostly look for dirt and rubbish places by tenants, as such house is, in all probability, otherwise in a sanitary condition.

For a report of an inspection see Report on pp. 104-105.

*Question* 13. I would try to remedy the evils by moral suasion and by showing to the tenants the necessity of their taking care of their premises and the importance of cleanliness to their health.

Nationality, length of residence, means of subsistence and comparative ignorance would determine my course only in so far as the use of tact, gentleness and care not to offend the tenants. Otherwise I do not see why people should be differently treated because they belong to a certain nationality, or are "green," poor, or ignorant.

## *ANSWERS TO PAPER II.*

*Question* 1. The evils which are likely to arise from overcrowding in tenement houses may be summed up as follows: "skin, jerry" and speculative building construc-

tion; lack of proper light and ventilation; defective plumbing and drainage; houses containing too many tenants; rooms and apartments containing too many occupants; too high rents; unsanitary conditions of premises; filth, dirt and rubbish in cellar, halls and rooms; dangers from fire and accidents; increased disease and death rate, etc.

*Question* 2. The temporary introduction of breakfast-cooking on premises does NOT make of the family hotel a tenement house, for the simple reason that the condition is but temporary and is not intended to last.

*Question* 3. See "Glossary of terms."

*Question* 4. NOTE—This is another unfair and absurd question. It is difficult enough for the candidate to learn the law as it is without going to the trouble of studying its history and the many amendments that are being made every year. A candidate is not supposed to be a legislative historian.

*Question* 5. See Law sections 90, 95 and 96.

*Question* 6. See Law section 19.

*Question* 7. Section 118 of the Sanitary Code forbids beating carpets, etc., wherever the dust thereof may enter occupied premises. In case I would see a violation of this section I would notify the person to desist, and, if persisted in, would report facts to my chief for proper action.

*Question* 8. See sections 66, 67, 68, 74 and 76. (Law.)

*Question* 9. It must not exceed one and a half times the width of the street.

Such height shall be the perpendicular distance measured in a straight line from curb level to the highest point of the roof beams.

*Question* 10. Because the contents of water closet trap may and does often back up and into the waste pipe of bath tub.

*Question* 11. In order to prevent accumulations of dirt thereat, also in order that any defect, leak or nuisance may be easily detected and remedied.

*Question* 12. See report on pages 104-105.

## *ANSWERS TO PAPER III.*

*Question* 1. The moral evils not reached by previous city departments, which the Tenement House Department is expected to correct, are the following: 1st, *overcrowding* of houses and rooms; 2d, *dark halls and rooms,* and 3d, *prostitution* in tenement houses.

The sanitary evils to be corrected are the following: inadequate inspection of tenement houses and lack of enforcement of building regulations; absence of adequate fire escapes and other protection against fire; the building of houses upon a too great area of the lot; the too small sizes of yards, courts, shafts and rooms; lack of proper ventilation of halls and rooms; inadequate lighting of halls and rooms; occupation of cellars and stores for businesses dangerous to life and health; occupation of cellars unfit for human habitation; presence of old and obsolete water closet accommodations; filthy condition of cellars, halls, rooms and other parts of tenement houses, and the many other minor sanitary evils which were left uncorrected by the former previous city departments owing to lack of funds, inadequate inspectorial force and other causes.

*Question* 2. The term "apartment" house is applied in general language to houses of superior construction with modern improvements and with a rental above the average; while under the term "tenement" house is understood a house of ordinary construction, without modern improvements, with a poorer class of tenants and with a cheaper rental. There is no difference in "legal" language between the two terms, as the law makes no distinction whatever between houses of different construction, regarding them all as tenement houses as long as they contain three and more families living separately and cooking on the premises.

*Question* 3. This means that the platform or balcony should be built so as to sustain four times 80 pounds per square foot, or 320 pounds, so as to have a factor of safety at a ratio of 4 to 1.

*Question* 4. The restrictions in reference to bakeries in non-fireproof tenement houses are the following: (a) the walls and ceilings shall be covered with fireproof material, and (b) there shall be no doors, windows, or other openings from the bakeries into the other parts of the house. By "fireproof" materials is meant stone, iron or any other incombustible materials; as regards bakeries, the practice is to cover walls and ceilings with sheet metal.

The "other dangerous businesses" referred to in the law are paint, oil, drug and liquor stores.

The "technical term" used in the law in reference to the "dangerous" businesses is "wire-glass."

By "wire-glass" is meant a glass so manufactured that a wire netting is embedded within the glass.

*Question* 5. The difference between a yard and court

is that a yard is an open, unoccupied space between the extreme line of the house and the rear line of the lot, while a court is an open, unoccupied space other than a yard, and may be surrounded by the house or extend to the street.

The difference between a cellar and basement is that a cellar is a story *more* than one-half below the level of the curb, while a basement is a story partly but *not more* than one-half below the level of the curb.

*Question* 6. This angle is determined from the line of the floor slats of the balcony of the fire escape, and the angle is two-thirds of the right angle formed by the above line and a perpendicular line from the balcony to the one below it.

"Goose-neck ladder" means the top ladder of the fire escape, which ladder is so formed that one of its ends is bent in the shape of a goose-neck.

"Battens" are the cross irons to which the floor slats of the platforms or balconies are riveted.

"Clear headway" means that the opening in the floor of balcony should remain open and unobstructed.

"Tread" is the upper level portion of a step in a stairway.

"String" is the inclined bar or side piece set edgewise as a support for the steps of a stairway.

"Bracket" is a right-angled triangle, one short side of which is applied vertically to the wall, and serving to support the balcony, or stairway.

*Question* 7. Three traps are necessary, for the reason that every fixture in the house should be *separately* trapped to prevent foul air from the pipes entering the rooms through the fixtures.

There is no difference whatever in the arrangement of the plumbing pipes themselves; the only difference being in the arrangement of the water service pipes; the following additional fixtures and pipes becoming necessary: A tank, an overflow pipe from the tank, a branch of the water house main to supply the tank, supply pipes from the tank to the fixtures of upper floors, and sometimes an engine to pump the water up to the tank.

*Question* 8. The rules and ordinances concerning the location and condition of fire escapes are the following:

1. Every Non-fireproof tenement house hereafter erected shall have fire escapes opening directly from at least one room in each apartment at each story above the ground floor, other than a bath room or water closet compartment, and shall not include the window of a stair hall, and no fire escape shall be placed in a court.

2. Every non-fireproof tenement house shall have a fire escape directly accessible to each apartment.

3. The owner of every tenement house shall keep all the fire escapes thereon in good order and repair, and whenever rusty shall have them properly painted with two coats of paint, and no person shall at any time place any incumbrance of any kind before or upon any such fire escapes.

The duty of the Fire Department, also of the Police Department.

I would first try to remedy the evil by personal effort by remonstrating with the tenants, housekeeper and owner, and, failing these, I would report the facts to the Chief Inspector of my Department.

*Question* 9. First, that filth is liable to be accumulated

within the inclosure; second, that the fixture becomes inaccessible and defects cannot be easily detected nor readily repaired.

Yes, it is a very good rule, for the same reasons as stated above, viz.: that defects are more easily detected and more readily remedied.

*Question* 10. The best materials for the following are:

Leaders—Cast iron, sheet metal. Reasons: Hard and durable.

Tubs—Soapstone, enameled iron. Reasons: Clean and durable.

Floors—Stone tiling, slate, hardwood. Clean, non-absorbent.

Partitions—Stud partitions mortared and plastered; are thick, bad conductors of sound, and are a better protection against the spread of fire than the ordinary wood partitions.

Windows—Wire-glass panes; these do not break so readily in case of fire.

Drains—Cast iron. Hard, durable and gas tight.

*Question* 11. The distinctions made in the Tenement House Law between houses already existing and those hereafter erected are very many, the following being the most important ones:

1. Fire escape construction is minutely provided for in the law for new houses, while in existing houses any fire escapes already upon them are allowed, whatever their construction. In new houses there must be fire escapes from every apartment, while in old houses fire escapes have to be accessible to every apartment.

2. The law minutely describes the percentage of lot to

be occupied, the size of house, yard, courts, halls and rooms in new houses, while it has no retroactive action upon existing houses.

3. The law provides fireproof stairways for new houses.

4. The law makes more stringent regulation in regard to light and ventilation of new houses as compared to old houses, also as to occupation of cellars and basement, water closet accommodations, water supply, and other sanitary provisions.

*Note.*—In order to properly and fully answer this question as to the distinctions made in the law between old and new houses I would have to quote the whole law, which is obviously an impossibility with the time allowed.

*Question* 12. To the Tenement House Commissioner of the City of New York.

New York, March 1, 1904.

Sir:—I respectfully report that on the 1st of March, 1904, I examined the premises and tenement house No. 183 Orchard street, and found that the said tenement house is a brick six story and cellar building, 25 feet front and 75 feet deep, and is arranged to accommodate 20 families in all, and four families on a floor, the lower story being occupied as a liquor saloon. The owner of said tenement house is John Johnson, of 111 West Eleventh street. *I found the facts as follows*:

1. That there is a school sink in the yard; said school sink is partly full of sewage, is not properly cleaned and flushed and is a nuisance to the tenants and neighborhood.

2. That the cellar is dirty with offensive refuse.

3. That the iron containers of the pan water closets on the 1st, 2d and 3d floor halls are old and corroded, the pans missing and the bowls of the water closets full of excreta.

4. That the roof leaks, causing dampness.

Respectfully submitted,

John Doe, Inspector 12th District.

*Note.*—The same form may be used for the other two reports which may assume other conditions, such as damp cellars, defective traps, etc.

*Question* 13. According to the Charter every tenement house should be inspected at least once a month, except houses the average monthly rental of which exceeds $25; but I think that an inspection of a tenement house should be made as often as the inspector of the district has reason to think that there are violations of the law in the house; outside of the monthly inspections every tenement house should be inspected whenever there are any complaints of unsanitary conditions in the house, or when there is a contagious disease in some of the apartments in the house.

Yes, the character of the tenants would make a difference in the frequency with which a house is to be inspected, as, other things being equal, a house with a better class of tenants ought not to require as frequent an inspection as a house with a bad class of inhabitants.

The particular points to which the inspection is to be directed *would* be determined by the nationality, length of residence, means of subsistence, etc., of the tenants; thus, there are some nationalities who as a rule keep their premises cleaner than others; moreover, those who are longer in the

country know better how to use the plumbing and other fixtures of the house; while the poorer class of tenants have not the desire, nor perhaps the time to keep rooms and halls clean, etc. The inspector, however, must be very careful not to trust preconceived notions, common prejudices, etc., and remember that there are exceptions to every rule, and especially to be careful not to judge nationalities by the action of a few of their members.

## *ANSWERS TO PAPER IV.*

*Question* 1. See chapter I, Q. 9.

*Question* 2. (a) Department of Buildings.

(b) He would have to file plans and specifications at the Building Bureau of the Tenement-House Department.

*Question* 3. Definitions of yard and court, see Section Law 2, also cellar and basement. For conditions of living therein see section Law 90, 95, 96.

*Question* 4. The height of a house is regulated by the width of the streets upon which it is situated, which it must not exceed one and half times.

The height is measured as per section 52.

The width and length of house are measured from line of wall to line of wall.

*Question* 5. See section Law 68, 19½ sq. ft.

*Question* 6. An intake is a duct or flue serving to let in fresh air into a shaft or court. Not less than three feet wide by seven feet high, section 63.

*Question* 7. The special advantages of "open plumbing" are that defects, leaks, etc., are readily seen and de-

tected and remedied; that not "being out of sight" the pipes, etc., are better taken care of, and that all defects, etc., are not difficult to repair. Yes, it would be quite a good idea to have all gas pipes exposed to. For the same reasons.

*Question* 8. To this question will apply the same comments as to question 4 of Question Paper No. 2.

*Question* 9. The advantage that such owners and agents can always be readily found when wanted, and made responsible for violations of the Law. Section 133.

*Question* 10. To repeat all distinctions made by the Law as relating to houses already erected and houses hereafter to be erected would be to repeat most of the law.

*Question* 11. See sections 65 and 66, Tenement Law.

*Question* 12. See section 105, Building Code.

Skeleton construction, section 110, Building Code.

When the tenement house is over 60 feet in height, or over 6 stories.

*Question* 13. See Report, page 105.

## *ANSWERS TO PAPER V.*

*Question* 1. Diffusion, motion and specific gravity.

*Question* 2. (a) Ventilation is a change of air, or the substitution of good air in a room for the bad air.

(b) Yes. There is no reason why we cannot have a change of air without light; do we not have ventilation during the night?

*Question* 3. (a) 400 c. f. for adults and 200 c. f. for children under 12 years.

(b) An apartment is a suite of rooms consisting of at least a kitchen, bed room and living room.

(c) 70 sq. feet.

(d) There is no legal limit in feet space, but must not be under 400 c. f. if occupied by one and, correspondingly larger, if occupied by more persons.

*Question* 4. 9 feet square are 81 sq. feet. The difference then will be 74 feet. We obtain result by multiplying 9 by 9 and substracting 7.

*Question* 5. (a) Less intense.

(b) The intensity of the light would decrease as the square of its distance.

*Question* 6. (a) The purity of the air in a room depends not upon the size of the room but upon the amount of air entering said room.

(b) 50 cubic feet per minute, or 3,000 c. f. per hour.

*Question* 7. (a) See section 73.

(b, c) See sections 62, 63.

(d) They must open upon yard, court, street. Tenements now existing may have their windows open into shafts.

*Question* 8. For definition see section 2, for sizes see section 58.

(c) Because there was not sufficient air space and therefore a lack of ventilation.

*Question* 9. The intakes for ventilation. The doors, etc., for cleanliness. Section 106.

*Question* 10. Multiply 13′10″ by 9′6″, divide result by 10 (one-tenth of the superficial area), this will give you the total sq. feet area demanded by law for this room. Divide this number by 2′10″ and you will get height of window.

*Question* 11. (a) 105 feet. (b) See section 52.

*Question* 12. The 30 per cent to open unoccupied space to be allowed in houses erected upon interior lots consists beside of the yards also of the inner and outer courts.

*Question* 13. (a) Section 79.

(b) Section 79.

*Question* 14. Minimum area 17 sq. feet; least dimension 4 feet.

(b) 25 sq. feet with not less than 4 feet width.

(c) See section 73.

## *ANSWERS TO PAPER VI.*

*Question* 1. In interior lots there must be left 30 per cent., in corner lots 10 per cent.

(b) For definition see section 2.

*Question* 2. See section 67.

*Question* 3. (a) Yes. 3 feet square are 9 square feet.

(b) It just means 65 parts of 100.

*Question* 4. (a) Least area of shafts see sections 75 and 79; of courts, see sections 57 and 58.

(b) See sections 75 and 79.

(c) See sections 67 and 68.

*Question* 5. 400 cubic feet for adult, 200 for child under 12 years.

*Question* 6. Rain leader, waste pipe, soil pipe, vent pipes, house drain, house sewer.

*Question* 7. Holes may be made in pipes or traps. The fixtures may become defective. The traps may be defective, have holes, lose their seal. The vertical pipes may settle

and get out of joint. The connections and joints may become defective and leaking. The flushing parts of the fixtures may get out of order.

*Question* 8. See chapter on plumbing, Q. 14.

*Questions* 9 and 10. A vent pipe in a tenement house is an air pipe made of cast-iron and intended to prevent siphonage and back-pressure, as well as to assist in the ventilation of the plumbing system.

(b) The branches should be attached at or near the crown of traps. They should be straight and avoid bends so as to prevent too much resistance to escape of air.

(c) The vent pipe may be attached on top *above* every fixture to the soil or water pipe, and to the same pipes *below* every fixture. The attachment should be by a "Y" branch, properly lead calked, and gas tight.

*Question* 11. The "fresh air" pipe is a pipe made to let in air into the plumbing system from the street. It is made of cast-iron, no less than 4″ in diameter and starts from inside of main house drain trap and goes outside of house either near curb ending in a closed and grated air-box, or ends with a return bend, both openings should be at least 15 feet away from a window.

*Question* 12. The method of "scamping" plumbing work may be as follows:

Substitution of light-weight pipe for heavy-weight; of light lead for heavy lead pipes, of iron ferrules for brass, of cap covers on manholes instead of screw caps.

Making defective joints by using too much oakum, too little lead, lead, or solder of inferior quality, not properly calked in, or solder wiping of a joint; not connecting prop-

erly the fixtures to pipes; not venting or "back-airing" fixtures; not extending vertical pipes to roof, or extending them not 4 inches in diameter, or too low or too near chimneys, etc.

The placing of house drain under ground not on specially prepared concrete trench, with not sufficient pitch; the elimination of a trap on rain leader, and many other faults too numerous to mention.

*Question* 13. See peppermint test, Q. 36, Plumbing chapter.

*Question* 14. See 28 in same chapter.

*Question* 15. See 16 in same chapter.

## *ANSWERS TO PAPER VII.*

### LAY SANITARY AND TENEMENT INSPECTORS.

*Question* 1. (a) All tenement houses hereafter erected exceeding six stories or parts of stories in height above the curb level.

(b) The most common fire-proof materials are brick, stone, iron or other hard incombustible material, such as concrete, terra-cotta, etc.

(c) Fire-proof materials are used in floor construction as follows:

(1) The floors are made of wrought-iron or steel floor beams between which shall be placed brick arches, the brick laid in cement mortar; or the space between beams may be filled in with hollow tile arches of burnt clay or porous terra cotta; or the space between beams may be filled in with Portland cement concrete.

(2) In partitions, fire-proof materials are used by the substitution of wood furring and lath by metal wire lath nailed directly upon the brick or iron stud columns.

(3) Posts, girders and trusses must be protected with no less than 2 inches of fire-proof materials, such as terra-cotta, concrete, etc., securely applied.

*Question* 2. (a) Concrete must be used in tenement house construction for cellar floors, footing and foundations.

(b) A good concrete is one made of best sand, cement and stones mixed with water, the whole mixture made so as to contain no voids or air spaces—a mixture which in every part of the surface of the aggregate is covered with cement paste in intimate contact with it, and all intervening spaces between the particles filled with cement paste.

(c) One way of making good concrete is by mixing one part of cement, two parts of sand and five parts of clean broken stone, or good clean gravel, instead of broken stone.

*Question* 3. (a) See section 63, Tenement Law.

(b) Wire-glass is glass in which wire is embedded in the process of manufacture. It is used for skylights, door panels, etc.

(c) Walls of courts and shafts. To increase light in apartments.

*Question* 4. (a) The principal objections to earthenware house drains is that they are not strong enough for the work they are supposed to do, they are brittle, easily broken and are not strong and durable.

(b) When the two houses are situated on one lot.

(c) Cast-iron pipes must be closed by the use of an

iron plug and properly lead calked joint. Wrought iron pipes must be closed by the use of a screw plug or cap. Lead pipes should be either removed and iron pipes closed as above, or the ends should be hammered in and soldered gas tight.

(d) When blow-holes are discovered in an iron drain pipe they may be plugged and reamed out provided they are not larger than the following sizes: ½″ for 2″ pipe, ¾″ for 3″, 1″ for 4″, 1 and ¼ for 5″, and 1½″ for a 6″ to 8″ pipe, whenever such openings are larger the whole length of pipe must be discarded.

*Question* 5. (a) Joints in iron house drains must be lead-calked.

(b) Iron and lead pipes must be connected by means of brass ferrules.

(c) Connections of lead waste pipes are made by solder wiped joints.

(d) It is not permissible, in the first place, because every fixture must be trapped separately within 2 feet from the fixture; in the second place, because when a bath tub is thus connected to water-closet trap, there is danger that dirty water and contents of water closet trap will back up and into bath tub waste pipe and may get into tub.

*Question* 6. The remedy in each of the following cases are as follows:

(a) Orders should be issued to owner of said vacant lot to remove nuisance.

(b) If the noise is excessive and is at night and disturbs sleep of tenants such report be made as facts to the Health Department for its proper action.

*Question* 7. (a) To test a trap for its seal being intact place a candle or match flame at mouth of fixture-opening, if flame is drawn in or blown out—trap is unsealed, otherwise, it is propably intact.

(b) See Chapter on Plumbing, Q. 35.

*Question* 8. See Tenement Law section 16.

(b) See Glossary.

*Question* 9. (a) Short-hopper water closets are a better form and more sanitary than long hopper closets, because the latter have a very large surface for the excreta to adhere to and very difficult to flush and clean.

(b) See Tenement House Law section 99.

*Question* 10. Use title, heading and other parts of report as in page 105.

1. The inspection was made on the 14th of May, at 10 a. m.

2. House is 5 stories high with four families on each floor.

3. There is no tank on premises.

4. Adjoining house (5 stories) on east and west sides of house have tanks supplying water.

5. There was no water on top floor in any of the apartments at time of inspection. Tenants assert that at no time of day is there water.

6. Tenants of first three stories have abundant water.

7. Tenants of fourth floor apartments have water occasionally, but only when lower floors do NOT use water. Water closets in yard.

## *RECOMMENDATIONS.*

That a tank of sufficient capacity be provided on roof, properly constructed and supported and so connected so that all tenants on all floors should have an adequate supply of water for all purposes at all times of day or night. The tank to be filled with water either by the increased night pressure, or, if this is inadequate to fill same, some motor pump be provided to fill tank at all times.

## *ANSWERS TO PAPER VIII.*

### LAY SANITARY AND TENEMENT INSPECTOR.

*Question* 1. (a) See Tenement Law, section 33.

(b) See Tenement Law, section 33.

(c) One part of lime or of cement to three parts of sand.

(d) A metal wire netting serving same purpose as wood laths.

*Question* 2. There is not much difference in the kind of clay which is made into brick of terra-cotta, the latter being made of clay mixed with other ingredients. The moulding of terra-cotta differs from that of brick, as it is made thinner and in plaques, also either in form of hollow quadrangular blocks or flat ornamental plaques. Terra-cotta is used less for common walls, etc., than brick and more for ornamental purposes, to cover skeleton iron work, to encase iron columns, or to fill in spaces between beams in floors and walls. Terra-cotta is not as durable as brick.

*Question* 3. Damp-proofing is necessary to use in all

tenement house construction for foundation and footing, and especially wherever the adjoining ground is apt to be damp and wet.

(b) See answer to Q. No. 34, in chapter 2d.

*Questions* 4 and 5. The functions of the following are as follows:

(a) *House drains*—To carry all the drainage from house soil, waste and other house pipes.

(b) *Running trap*—To seal house side of pipes from sewer.

(c) *Soil pipes*—To carry sewage and soil from water closets and bath-tubs.

(d) *Vent-pipes*—To prevent siphonage and back-pressure and ventilate pipe.

(e) *Main waste pipe*—To carry all waste water from sinks, tubs and basins.

(f) *Rain leaders*—To carry off all rain and snow water from roof.

(g) *Fresh-air inlet*—To let in and circulate fresh air into house drain.

(h) *House seal*—In running trap, to prevent entrance of sewer air.

*Question* 6. (1) The removal of floor or any part thereof, in the entrance hall, or the removal of any portion of the stairways of the building, or the removal of the ladder from top story to roof.

(2) Serious interference, or removal of part or of whole of the fire-escape system.

(3) The removal of part or whole of any wall or any part of building so as to render building unsafe or dangerous.

(4) Failure to provide sufficient water closet accommodations, or adequate water supply at all floors at all times.

(5) The removal or alteration of any part of the plumbing system whereby a nuisance would be created, or any alteration in windows leading to fire-escapes so that same shall be less than two feet in width between stop heads.

*Question* 7. (a) By extension 4" in diameter above the roof.

(b) The extension above roof may be of smaller calibre, or there may be no connection whatever between the length of pipe above roof and the waste pipe, the extension piece being a "blind" or stuck in part.

(c) An extension length of smaller than 4" calibre can be readily seen. A "blind" extension length may be tested either by putting in water into pipe, or by holding flame of candle or match to outlet of pipe when the absence of air current therein will indicate a dead end.

*Question* 8. (a) The following are the most common causes of escape of sewer air in tenements: Holes, defects, etc., in the house drain or vertical pipes; defective points and connections of horizontal and vertical pipe length and of lead and iron branch waste and soil pipes; unsealed traps through evaporation, siphonage or momentum; holes, defects, etc., in the lead and iron traps of sinks, tubs and other fixtures.

(b) An escape of sewer air from the above stated defects can be prevented. 1st, by the original installation of the plumbing pipes of proper material, workmanship and perfection; 2nd, by a proper test of the plumbing system before approving same; 3rd, by frequent inspection and ex-

amination of the pipes, etc., during the occupation of house; 4th, by prompt repairing of all defects.

(c) See answer No. 9-11 in Chapter on Plumbing.

*Question* 9. (a) Pine, spruce, hemlock, ash, oak.

(b) The cause of "dry rot" in woodwork is a fungus called *Merilus Lachrimans* (haushwamm) which decomposes the wood and turns it into an ill-smelling powder. The presence of the fungus is favored by dampness and moisture of woodwork and by insufficient airing and ventilation.

The part of building where "dry rot" is most commonly apt to occur is in cellar floor (if of wood) in cellar ceiling beams and joists, when damp and covered by air-tight floor coverings, and in all parts of woodwork which keeps and retains dampness without a chance of evaporating the moisture by air currents.

(c) The recommendations which I would make under such conditions are: 1st, to prevent the occurence of "dry-rot" by employing well seasoned dry wood, by preventing dampness and moisture in houses and woodwork, and by a proper ventilation system so that all parts of house be exposed to currents of air; 2nd, in case "dry-rot" has already occurred, to treat the wood by plenty of sunlight, by air, also by solutions of salt, carbolic acid, copper sulphate, or by painting the joists and lower floor boards with birch oil.

*Question* 10. (a) See Dr. Price's "Handbook on Sanitation," page 82.

(b) Slate, tile and marble.

# APPENDIX

I. New York City Plumbing.
   Rules and Regulations.

II. Section of the N. Y. Sanitary Code.
   Relating to Houses.

III. The New York Tenement House Law.
   1. Questions on the Law.
   2. Glossary of Difficult Terms.
   3. Text of the Law.
   4. New Fire-Escape Regulations.

## *RULES AND REGULATIONS FOR PLUMBING, DRAINAGE, WATER SUPPLY AND VENTILATION OF BUILDINGS.*

NOTE.—MATTER IN ITALICS APPLIES TO BROOKLYN, BUT NOT TO MANHATTAN. MATTER IN BRACKETS APPLIES TO MANHATTAN, BUT NOT TO BROOKLYN. UNLESS OTHERWISE INDICATED, REGULATIONS APPLY TO BOTH BROOKLYN AND MANHATTAN.

### I.—FILINGS OF DRAWINGS, DESCRIPTIONS, ETC.

1. Drawings and triplicate descriptions, on forms furnished by the bureau of buildings for all plumbing and drainage, shall be filled in with ink and filed by the owner or architect in the said bureau. The plans must be drawn to scale in ink, on cloth, or they must be cloth prints of such scale drawings, and shall consist of such floor plans and sections as may be necessary to show clearly all plumbing work to be done, and must show partitions and method of ventilating water closet apartments.

2. The said plumbing and drainage shall not be commenced or proceeded with until said drawings and descriptions shall have been so filed and approved by the superintendent of buildings.

3. No modification of the approved drawings and descriptions will be permitted unless either amended drawings and triplicate descriptions or an amendment to the original drawings and descriptions, covering the proposed change or changes, are so filed and approved by the superintendent of buildings.

4. The drainage and plumbing of all buildings, both public and private, shall be executed in accordance with the rules and regulations of the bureau of buildings.

5. Repairs or alterations of plumbing or drainage may be made without filing drawings and descriptions in the bureau of buildings, but such repairs or alterations shall not be construed to include cases where new vertical or horizontal lines of soil, waste, vent or leader pipes are proposed to be used.

6. Notice of such repairs or alterations shall be given to the said bureau before the same are commenced in such cases as shall be prescribed by the rules and regulations of the said bureau, and the work shall be done in accordance with the said rules and regulations.

7. Where repairs or alterations ordered by the Board of Health for sanitary reasons include cases where new vertical and horizontal lines of soil, waste, vent or leader pipes are proposed to be used or old ones replaced, drawings and descriptions must be filed with and approved by the superintendent of buildings before the same shall be commenced or proceeded with.

8. Repairs and alterations may comply in all respects with the weight, quality, arrangement and venting of the rest of the work in the building.

9. It shall not be lawful to commence work on said plumbing and drainage or on any part thereof until the plumber who is to do the work shall sign the specifications and make affidavit that he is duly authorized to proceed with the work. Affidavit must give the name and address of owner and plumber, etc.

10. One set of specifications will be received for not more than ten houses, and then only when on adjoining lots and houses are exactly alike.

11. Written notices must be given to the superintendent of buildings by the plumber when any work is begun, and from time to time when any work is ready for inspection. All notices required must be sent in on blank forms furnished by the bureau of buildings.

## II.—DEFINITION OF TERMS.

12. The term "private sewer" is applied to main sewers that are not constructed by and under the supervision of the Bureau of Sewers.

13. The term "house sewer" is applied to that part of the main drain or sewer extending from a point two feet outside

of the outer wall of the building, vault or area, to its connection with public sewer, private sewer or cesspool.

14. The term "house drain" is applied to that part of the main horizontal drain and its branches inside the walls of the building, vault or area, and extending to and connecting with the house sewer.

15. The term "soil-pipe" is applied to any vertical line of pipe extending through roof, receiving the discharge of one or more water-closets, with or without other fixtures.

16. The term "waste-pipe" is applied to any pipe receiving the discharge from any fixtures except water-closets.

17. The term "vent-pipe" is applied to any special pipe provided to ventilate the system of piping and to prevent trap siphonage and back pressure.

## III.—MATERIALS AND WORKMANSHIP.

18. All materials must be of the best quality, free from defects, and all work must be executed in a thorough, workmanlike way.

19. All cast-iron pipes and fittings must be uncoated, sound, cylindrical and smooth, free from cracks, sand holes and other defects, and of uniform thickness and of the grade known in commerce as "extra heavy."

20. Pipe, including the hub, shall weigh not less than the following average weights per linear foot:

| Diameters. | Weights per linear foot. | |
|---|---|---|
| 2 inches | 5½ | pounds |
| 3 inches | 9½ | " |
| 4 inches | 13 | " |
| 5 inches | 17 | " |
| 6 inches | 20 | " |
| 7 inches | 27 | " |
| 8 inches | 33½ | " |
| 10 inches | 45 | " |
| 12 inches | 54 | " |

21. The size, weight and maker's name must be cast on each length of the pipe.

22. All joints must be made with picked oakum and molten lead and be made gastight. Twelve (12) ounces of fine, soft pig lead must be used at each joint for each inch in the diameter of the pipe.

23. All wrought-iron and steel pipes must be equal in quality to "standard," and must be properly tested by the manufacturer. All pipe must be lap-welded. No plain black or uncoated pipe will be permitted.

24. Wrought-iron and steel pipes must be galvanized, and each length must have the weight and maker's name stamped on it.

25. Fittings for vent-pipes on wrought-iron and steel pipes may be the ordinary cast or malleable steam and water fittings.

26. Fittings for waste or soil and refrigerator waste-pipes must be the special extra heavy cast-iron recessed and threaded drainage fittings with smooth interior waterway and threads tapped, so as to give a uniform grade to branches of not less than one-fourth of an inch per foot. All fittings for wrought-iron or steel pipes must be galvanized.

27. All joints to be screwed joints made up with red lead, and the burr formed in cutting must be carefully reamed out.

28. Short nipples on wrought-iron or steel pipe, where the unthreaded part of the pipe is less than one and one-half inches long, must be of the thickness and weight known as "extra heavy" or "extra strong."

29. The pipe shall not be less than the following average thickness and weight per linear foot:

| | Thicknesses (inches). | Weights per Linear foot (pounds). |
|---|---|---|
| 1½ inches | .14 | 2.68 |
| 2 inches | .15 | 3.61 |
| 2½ inches | .20 | 5.74 |
| 3 inches | .21 | 7.54 |

TABLE—CONTINUED.

| | Thicknesses (inches). | Weights per Linear foot (pounds). |
|---|---|---|
| 3½ inches | .22 | 9.00 |
| 4 inches | .23 | 10.66 |
| 4½ inches | .24 | 12.34 |
| 5 inches | .25 | 14.50 |
| 6 inches | .28 | 18.76 |
| 7 inches | .30 | 23.27 |
| 8 inches | .32 | 28.18 |
| 9 inches | .34 | 33.70 |
| 10 inches | .36 | 40.06 |
| 11 inches | .37 | 45.02 |
| 12 inches | .37 | 48.98 |

30. All brass pipes for soil, waste and vent pipes and solder nipples must be thoroughly annealed, seamless, drawn brass tubing, of standard iron-pipe gauge.

31. Connections on brass pipe and between brass pipe and traps on iron pipe must not be made up with slip joints or couplings. Threaded connections on brass pipe must be of the same size as iron-pipe threads for same size of pipe, and be tapered.

32. The following average thicknesses and weights per linear foot will be required:

| Diameters. | Thicknesses. | Weights per linear foot. |
|---|---|---|
| 1½ inches | .14 inches | 2.84 pounds |
| 3 inches | .15 inches | 3.82 pounds |
| 3½ inches | .20 inches | 6.08 pounds |
| 3 inches | .21 inches | 7.92 pounds |
| 3½ inches | .22 inches | 9.54 pounds |
| 4 inches | .23 inches | 11.29 pounds |
| 4½ inches | .24 inches | 13.08 pounds |
| 5 inches | .25 inches | 15.37 pounds |
| 6 inches | .28 inches | 19.88 pounds |

33. Brass ferrules must be best quality, bell-shaped, extra heavy cast brass, not less than four inches long and two and one-quarter, three and one-half inches, and four and one-half inches in diameter, and not less than the following weights:

| Diameters. | Weights. |
|---|---|
| 2¼ inches | 1 pound 0 ounces |
| 3½ inches | 1 pound 12 ounces |
| 4½ inches | 2 pounds 8 ounces |

34. One and one-half inch ferrules are not permitted.

35. Soldering nipples must be heavy cast brass or of brass pipe, iron pipe size. When cast they must not be less than the following weights:

| Diameters. | Weights. |
|---|---|
| 1½ inches | 0 pounds 8 ounces |
| 2 inches | 0 pounds 14 ounces |
| 2½ inches | 1 pound 6 ounces |
| 3 inches | 2 pounds 0 ounces |
| 4 inches | 3 pounds 8 ounces |

36. Brass screw caps for cleanouts must be extra heavy, not less than one-eighth of an inch thick. The screw cap must have a solid square or hexagonal nut, not less than one inch high, with a least diameter of one and one-half inches. The body of the cleanout ferrule must be at least equal in weight and thickness to the calking ferrule for the same size of pipe.

37. Where cleanouts are required by rules and by the approved plans, the screw cap must be of brass. The engaging parts must have not less than six threads of iron pipe size and be tapered. Cleanouts must be of full size of trap up to four inches in diameter, and not less than four inches for larger traps.

38. The use of lead pipes is restricted to the short branches of the soil and waste pipes, bends and traps, and roof connec-

tions of inside leaders. "Short branches" of lead pipe to be constructed to mean not more than:

5 feet of 1½-inch pipe.
4 feet of 2- inch pipe.
2 feet of 3- inch pipe.
2 feet of 4- inch pipe.

39. All connections between lead pipes and between brass or copper pipes must be made by means of wiped soldered joints, and all floor flanges of all sanitary fixtures and all connections between said fixtures and waste or soil pipes, where said connections are on outlet or sewer side of trap, shall be made with strong and carefully prepared red lead putty.

40. All lead waste soil, vent and flush pipes must be of the best quality, known in commerce as "D," and of not less than the following weights per linear foot:

| | Weights per linear foot. |
|---|---|
| 1¼ inches (for flush pipes only) | 2½ pounds |
| 1½ inches | 3 pounds |
| 2 inches | 4 pounds |
| 3 inches | 6 pounds |
| 4 and 4½ inches | 8 pounds |

41. All lead traps and bends must be of the same weight and thickness as their corresponding pipe branches. Sheet lead for roof flashings must be six-pound lead and must extend not less than six inches from the pipe and the joint made water-tight.

42. Copper tubing when used for inside leader roof connections must be seamless drawn tubing, not less than 22-gauge, and when used for roof flashings must not be less than 18-gauge.

## IV.—GENERAL REGULATIONS.

43. The entire plumbing and drainage system of each building must be entirely separate and independent of that of any other building.

44. Each building must be separately and independently connected with a public or private sewer, or cesspool.

45. Every building must have its sewer connections directly in front of the building, unless permission is otherwise granted by the superintendent of buildings.

46. Where there is no sewer in the street or avenue, and it is possible to construct a private sewer to connect in an adjacent street or avenue, a private sewer must be constructed. It must be laid outside the curb, under the roadway of the street.

47. Cesspools and privy-vaults will be permitted only after it has been shown to the satisfaction of the superintendent of buildings that their use is absolutely necessary.

48. When allowed, they must be constructed strictly in accordance with the terms of the permit issued by the superintendent of buildings.

49. Cesspools must not be used as privy-vaults. Cesspools and privy-vaults must be at least twenty-five feet from any building and should be on the same lot with the building for which its use is intended. Cesspools and privy-vaults, when constructed of brick, must be eight inches thick; of stone, twenty inches thick.

50. All cesspools and privy-vaults must be made water-tight.

51. As soon as it is possible to connect with a public sewer the owner must have the cesspool and privy-vault emptied, cleaned and disinfected and filled with fresh earth, and have a sewer connection made in the manner herewith prescribed.

52. All pipe lines must be supported at the base on brick piers or by heavy iron hangers from the cellar-ceiling beams, and along the line by heavy iron hangers at intervals of not more than ten feet.

53. All pipes issuing from extension or elsewhere, which would otherwise open within thirty feet of the window of any building, must be extended above the highest roof and well away and above all windows.

54. The arrangement of all pipes must be as straight and direct as possible. Offsets will be permitted only when unavoidable.

55. All pipes and traps should, where possible, be exposed to view. They should always be readily accessible for inspection and repairing.

56. In every building where there is a leader connected to the drain, if there are any plumbing fixtures, there must be at least one four (4) inch pipe extending above the roof for ventilation.

## V.—YARD, AREA AND OTHER DRAINS.

57. All yards, areas and courts must be drained.

58. Lodging houses must have their yards, areas and courts drained into the sewer.

59. These drains, when sewer connected, must have connections not less than three inches in diameter. They should be controlled by one trap—the leader trap if possible.

60. Cellar drains will be permitted only where they can be connected to a trap with a permanent water seal.

61. Subsoil drains should discharge into a sump or receiving tank, the contents of which must be lifted and discharged into the drainage system above the cellar bottom by some approved method. Where directly sewer connected they must be cut off from the rest of the plumbing system by a brass flap valve on the inlet to the catch-basin, and the trap on the drain from the catch-basin must be water supplied, as required for cellar drains.

62. Floor or other drains will only be permitted when it can be shown to the satisfaction of the superintendent of buildings that their use is absolutely necessary and arrangements made to maintain a permanent water seal in the traps.

## VI.—LEADERS.

63. All buildings shall be kept provided with proper metallic

leaders for conducting water from the roofs in such manner as shall protect the walls and foundations of said buildings from injury. In no case shall the water from said leaders be allowed to flow upon the sidewalk, but the same shall be conducted by pipe or pipes to the sewer. If there be no sewer in the street upon which such buildings front, then the water from said leader shall be conducted by proper pipe or pipes below the surface of the sidewalk to the street gutter.

64. Inside leaders must be made of cast iron, wrought iron or steel with roof connections made gas and water tight by means of a heavy lead or copper-drawn tubing wiped or soldered to a brass ferrule or nipple calked or screwed into the pipe.

65. Outside leaders may be of sheet metal, but they must connect with the house-drain by means of a cast iron pipe extending vertically five feet above grade level.

66. Leaders must be trapped with cast iron running traps so placed as to prevent freezing.

67. Rain water leaders must not be used as soil, waste or vent pipes, nor shall any such pipe be used as a leader.

## VII.—THE HOUSE SEWER, HOUSE DRAIN, HOUSE TRAP AND FRESH-AIR INLET.

68. Old house sewers can be used in connection with the new buildings or new plumbing only when they are found, on examination by the plumbing inspector to conform in all respects to the requirements governing new sewers.

69. When a proper foundation, consisting of a natural bed of earth, rock, etc., can be obtained, the house sewer can be of earthenware pipe.

70. Where the ground is made or filled in, or where the pipes are less than three feet deep, or in any case where there is danger of settlement by frost or from any cause, and when cesspools are used, the house sewer must be of extra heavy cast-iron pipe, with lead-calked joints.

71. The house drain and its branches must be of extra heavy cast-iron, when underground, and of extra heavy cast-iron or galvanized wrought-iron or steel when above ground.

72. The house drain must properly connect with the house sewer at a point two feet outside of the outer front vault or area wall of the building. An arched or other proper opening must be provided for the drain in the wall to prevent damage by settlement.

73. If possible, the house drain must be above the cellar floor. The house drain must be supported at intervals of ten feet by eight-inch brick piers or suspended from the floor beams, or be otherwise properly supported by heavy iron pipe hangers at intervals of not more than ten feet.

74. No steam exhaust, boiler blow-off or drip pipe shall be connected with the house drain or sewer. Such pipes must first discharge into a proper condensing tank, and from this a proper outlet to the house sewer outside of the building must be provided. In low pressure steam systems the condensing tank may be omitted, but the waste connection must be otherwise as above required.

75. The house drain and house sewer must be run as direct as possible, with a fall of at least one-quarter inch per foot, all changes in direction made with proper fittings, and all connections made with Y branches and ⅛ and 1/16 bends.

76. The house sewer and house drain must be at least four inches in diameter where water-closets discharge into them. Where rain water discharges into them the house sewer and house drain up to the leader connections must be in accordance with the following table:

| Diameters. | Fall ¼ in. per ft. (sq. ft.) | Fall ½ in. per ft. (sq. ft. drainge of area.) |
|---|---|---|
| 6 inches | 5,000 | 7,500 |
| 7 inches | 6,900 | 10,300 |
| 8 inches | 9,100 | 13,600 |
| 9 inches | 11,600 | 17,400 |

77. Full size Y and T branch fittings for handhole cleanouts must be provided where required on house drain and its branches.

78. An iron running trap must be placed on the house drain near the wall of the house, and on the sewer side of all connections, except a drip-pipe where one is used. If placed outside the house or below the cellar floor, it must be made accessible in a brick manhole, the walls of which must be eight inches thick, with an iron or flagstone cover. When outside the house it must never be less than three feet below the surface of the ground.

The house trap must have two cleanouts with brass screw cap ferrules calked in.

79. A fresh air inlet must extend to the outer air, and open into the side of a box not less than eighteen inches square, placed below the sidewalk at the curb. The bottom of the box must be eighteen inches below the under side of the fresh air inlet pipe. The box may be of cast iron or it may be constructed with eight-inch walls of brick or flagstone laid in hydraulic cement. The box must be covered by a flagstone fitted with removable metal grating, leaded into the stone, having openings equal in area to the area of the fresh air inlet, and not less than one-half inch in their least dimension. The fresh air inlet must be of the same size as the drain up to four inches; for five-inch and six-inch drain it must not be less than four inches in diameter, and for larger drains not less than eight inches in diameter, the removable portion of grate to be at least eight by twelve inches in area.

## VIII.—SOIL AND WASTE PIPES.

80. All main, soil, waste or vent pipes must be of iron, steel or brass.

81. When they receive the discharge of fixtures on any floor above the first, they must be extended in full calibre at least one foot above the roof coping, and well away from all

shafts, chimneys, windows or other ventilating openings. When less than four inches in diameter, they must be enlarged to four inches at a point not less than one foot below the roof surface by an increaser not less than nine (9) inches long.

82. No caps, cowls or bends shall be affixed to the top of such pipe.

83. In lodging houses wire baskets must be securely fastened into the opening of each pipe that is in an accessible position.

84. Necessary offsets above the highest fixture branch must not be made at an angle of less than 45 degrees to the horizontal.

85. Soil and waste pipes must have proper Y branches for all fixture connections.

86. No connection to lead branches for water-closets or slop sinks will be permitted, except the required branch vent.

87. Branch soil and waste pipe must have a fall of at least one-quarter inch per foot.

88. Short TY branches will be permitted on vertical lines only. Long one-quarter bends and long TYs are permitted. Short one-quarter bends and double hubs, short roof increasers and common offsets, and bands and saddles are prohibited.

89. The diameters of soil and waste pipes must not be less than those given in the following tables:

| | Inches. |
|---|---|
| Main soil pipes | 4 |
| Main soli pipes for water closets on five or more floors | 5 |
| Branch soil pipes | 4 |
| Main waste pipes | 2 |
| Main waste pipes for kitchen sinks on five or more floors | 3 |
| Branch waste pipes for laundry tubs | 1½ |
| When set in ranges of three or more | 2 |
| Branch waste for kitchen sinks | 2 |
| Branch waste for urinals | 2 |
| Branch waste for other fixtures | 1½ |

## IX.—VENT-PIPES.

90. All traps must be protected from siphonage and back pressure, and the drainage system ventilated by special lines of vent-pipes.

91. All vent-pipe lines and main branches must be of iron, steel or brass. They must be increased in diameter and extended above the roof as required for waste-pipes. They may be connected with the adjoining soil or waste line well above the high fixture, but this will not be permitted when there are fixtures on more than six floors.

92. All offsets must be made at an angle of not less than forty-five degrees to the horizontal, and all lines must be connected at the bottom with soil or waste-pipe or the drain in such a manner as to prevent the accumulation of rust scale.

93. Branch vent-pipes should be kept above the top of all connecting fixtures, to prevent the use of vent-pipes as soil or waste-pipes. Branch vent-pipes should be connected as near to the crown of the trap as possible.

94. Earthenware traps for water-closets and slop sinks must be ventilated from the branch soil or waste-pipe just below the trap, and this branch vent-pipe must be so connected as to prevent obstruction, and no waste-pipe connected between it and the fixture. Earthenware traps must have no vent-horns.

95. No sheet metal, brick or other flue shall be used as a vent-pipe.

96. The sizes of vent-pipes throughout must not be less than the following:

For main vents and long branches, two inches in diameter; for water-closets on three or more floors, three inches in diameter; for other fixtures on less than seven floors, two inches in diameter; three-inch vent-pipe will be permitted for less than nine stories, for more than eight and less than sixteen stories, four inches in diameter; for more than fifteen and less than twenty-two stories, five inches in diameter; for more than twenty-one stories, six inches in diameter; branch vents for

traps larger than two inches, two inches in diameter; branch vents for traps two inches or less, one and one-half inches in diameter.

For fixtures other than water-closets and slop-sinks and for more than eight (8) stories, vent-pipes may be one (1) inch smaller than above stated.

## X.—TRAPS.

97. No form of trap will be permitted to be used unless it has been approved by the bureau of buildings, and no masons' cesspool, bell, pot, bottle or D-trap will be permitted, nor any form of trap that is not self-cleaning nor has interior chamber or mechanism, nor any trap, except earthenware ones, that depend upon interior partitions for a seal.

98. Every fixture must be separately trapped by a water-sealing trap placed as close to the fixture outlet as possible.

99. A set of wash trays may connect with a single trap, or into the trap of an adjoining sink, provided both sink and tub waste outlets are on the same side of the waste line, and the sink is nearest the line. When so connected the waste-pipe from the wash trays must be branched in below the water seal.

100. The discharge from any fixture must not pass through more than one trap before reaching the house drain.

101. All traps must be well supported and set true with respect to their water levels.

102. All fixtures other than water-closets and urinals must have strong metallic strainers or bars over the outlets to prevent obstruction of the waste-pipe.

103. All exposed or accessible traps, except water-closet traps, must have brass trap screws for cleaning the trap placed on the inlet side, or below the water level.

104. All iron traps for house, drain, yard and other drains and leaders must be running traps with handhole cleanouts of full size of the traps when the same are less than five (5) inches.

All traps underground must be made accessible by brick manholes with proper covers.

105. Overflow pipes from fixtures must in all cases be connected on the inlet side of traps.

106. All earthenware traps must have brass floor plates soldered to the lead bends, or where brass or iron pipes are used, to be screwed to the same and bolted to the trap flange and the joint be made gas-tight with strong and carefully prepared red lead putty.

107. No trap shall be placed at the foot of main soil and waste-pipe lines.

108. The sizes for traps must not be less than those given in the following table:

| | | |
|---|---|---|
| Traps for water closets | 4 | inches in diameter |
| Traps for slop sinks | 2 | inches in diameter |
| Traps for kitchen sinks | 2 | inches in diameter |
| Traps for wash trays | 2 | inches in diameter |
| Traps for urinals | 2 | inches in diameter |
| Traps for other fixtures | 1½ | inches in diameter |

Traps for leaders, areas, floor and other drains must be at least 3 inches in diameter.

## XI.—SAFE AND REFRIGERATOR WASTE-PIPES.

109. Safe and refrigerator waste-pipes must be of galvanized iron, and be not less than one and one-quarter (1¼) inches in diameter, with lead branches of the same size, with strainers over the inlets secured by a bar soldered to the lead branch.

110. Safe waste-pipes must not connect directly with any part of the plumbing system.

111. Safe waste-pipes must either discharge over an open, water-supplied, publicly placed, ordinarily used sink, placed not more than three and one-half feet above the cellar floor.

112. The safe waste-pipe from a refrigerator [must be trapped at the bottom of the line only and] cannot discharge upon the ground or floor. It must discharge over some properly trapped, water-supplied sink, as above. In no case shall the refrigerator waste-pipe discharge over a sink located in a room used for lying purposes.

113. The branches on vertical lines must be made by Y fittings, and be carried up to the safe with as much pitch as possible.

114. Lead safes must be graded and neatly turned over bevel strips at their edges.

115. Where there is an offset on a refrigerator waste-pipe in the cellar, there must be cleanouts to control the horizontal part of the pipe.

116. In tenement houses [lodging houses] the refrigerator waste-pipes must extend above the roof, and must not be larger than one and one-half inches, nor the branches smaller than one and one-quarter inches.

117. Refrigerator waste-pipes [except in tenement houses] and all safe waste-pipes must have brass flap-valves at their lower ends.

## XII.—WATER CLOSETS.

118. In lodging houses, factories, workshops and all public buildings, the entire water-closet apartment and side walls to a height of six inches from the floor, except at the door, must be made waterproof with asphalt, cement, tile, metal or other waterproof material as approved by the bureau of buildings.

119. In lodging-houses the water-closet and urinal apartments must have a window opening to the outer air; if three stories or less in height, they may have such window opening on a ventilating shaft not less than ten square feet in area.

120. In all buildings the outside partition of such apartment must extend to the ceiling or be independently ceiled over,

and these partitions must be airtight. The outside partitions must include a window opening to outer air on the lot whereon the building is situated, or some other approved means of ventilation must be provided. When necessary to properly light such apartments, the upper part of the partitions must be made of glass. The interior partitions of such apartments must be dwarfed partitions.

121. The general water closet accommodations for a [tenement or] lodging house cannot be placed in the cellar.

122. No water closet can be placed outside of a building.

123. The closets must be set open and free from all inclosing woodwork.

124. Where water closets will not support a rim seat, the seat must be supported on galvanized iron legs, and a drip tray must be used.

125. Every earthernware closet in all new work and in all alterations where it is not impossible to use it because of water pipes or other obstructions, must be set on a natural stone slab. Sand or artificial stone or tile will not be allowed.

126. All water closets must have earthenware flushing rim bowls. "Pipe wash" bowls or hoppers will not be permitted.

127. Pan, valve, plunger, offset washout and other water closets having an unventilated space, or whose walls are not thoroughly washed at each discharge, will not be permitted.

128. Long hoppers will not be permitted, except where there is an exposure to frost.

129. The connections of traps must be made to main soil, waste or vent pipe, by means of lead calked or screwed joints. Drip trays must be enameled on both sides and secured in place.

130. In all sewer-connected occupied buildings there must be at least one water closet, and there must be additional closets so that there will never be more than fifteen persons per closet.

131. In lodging houses there must be one water closet on each floor, and where there are more than fifteen persons on any floor there must be an additional water closet on that floor for every fifteen additional persons or fraction thereof.

132. Water closets and urinals must never be connected directly with or flushed from the water supply pipes.

133. Water closets and urinals must be flushed from separate cisterns on each floor, the water from which is used for no other purpose, and in no case are connections to be made direct with the water service pipe.

134. The overflow of cisterns may discharge into the bowls of the closet, but in no case connect with any part of the drainage system.

135. Iron water closet and urinal cisterns and automatic water closet and urinal cisterns are prohibited.

136. The copper lining of water closet and urinal cisterns must not be lighter than ten (10) ounces copper.

137. Water closet flush pipes must not be less than one and one-fourth inches and urinal flush pipes one (1) inch in diameter, and if of lead must not weigh less than two and one-half pounds and two pounds per linear foot. Flush couplings must be of full size of the pipe.

138. Latrine's trough water closets and similar appliances may be used only on written permit from the superintendent of buildings, and must be set and arranged as may be required by the terms of the permit.

139. All urinals must be constructed of materials impervious to moistures that it will not corrode under the action of urine. The floor and wall of the urinal apartments must be lined with similar non-absorbent and non-corrosive material.

140. The platforms or treads of urinal stalls must never be connected independently to the plumbing system, nor can they be connected to any safe waste pipe.

141. Iron trough water closets and trough urinals must be enameled or galvanized.

142. All [in lodging houses] sinks must be entirely open, on iron legs or brackets, without any inclosing woodwork.

143. Wooden washtubs are prohibited. Cement or artificial stone tubs will not be permitted unless approved by the bureau of buildings.

## XIII.—WATER SUPPLY FOR FIXTURES.

144. All water closets and other plumbing fixtures must be provided with a sufficient supply of water for flushing to keep them in a proper and cleanly condition.

145. When the water pressure is not sufficient to supply freely and continuously all fixtures, a house supply tank must be provided of sufficient size to afford an ample supply of water to all fixtures at all times. Such tank must be supplied from the pressure or by pumps, as may be necessary; when from the pressure, ball cocks must be provided.

146. If water pressure is not sufficient to fill housetank, power pumps must be provided for filling them in lodging houses, factories and workshops.

147. Tanks must be covered so as to exclude dust, and must be so located as to prevent water contamination by gas and odors from the plumbing fixtures.

148. House supply tanks must be of wood or iron or of wood lined with tinned and planished copper.

149. House tanks must be supported on iron beams.

150. The overflow pipe should discharge upon the roof, where possible, and in such cases should be brought down to within six (6) inches of the roof, or it must be trapped and discharged over an open and water-supplied sink not in the same room, not over 3½ feet above the floor. In no case shall the overflow be connected with any part of the plumbing system.

151. Emptying pipes for such tanks must be provided and be discharged in the manner required for overflow pipes, and may be branched into overflow pipes.

152. No service pipes or supplying pipes should be run, and no tanks, flushing cisterns or water-supplied fixtures should be placed where they would be exposed to frost.

153. Where so placed they shall be properly packed and boxed in such manner as to prevent freezing.

## XIV.—TESTING THE PLUMBING SYSTEM.

154. The entire plumbing and drainage system within the building must be tested by the plumber in the presence of a plumbing inspector, under a water or air test, as directed. All pipes must remain uncovered in every part until they have successfully passed the test. The plumber must securely close all openings as directed by the inpector of plumbing. The use of wooden plugs for this purpose is prohibited.

155. The water test will be applied by closing the lower end of the main house drain and filling the pipes to the highest opening above the roof with water. The water test shall include at one time the house drain and branches, all vertical and horizontal soil, waste and vent and leader lines and all branches therefrom to point above the surface of the finished floor and beyond the finished face of walls and partitions. Deviation from the above rule will not be permitted unless upon written application to and approval by the superintendent of buildings. If the drain or any part of the system is to be tested separately, there must be a head of at least six (6) feet above all parts of the work so tested, and special provision must be made for including all joints and connections in at least one test.

156. The air test will be applied with a force pump and mercury columns under ten pounds pressure, equal to twenty inches of mercury. The use of spring gauges is prohibited.

157. After the completion of the work, when the water has been turned on and the traps filled, the plumber must make a peppermint or smoke test in the presence of a plumbing inspector and as directed by him, and no device shall be used to apply said smoke test unless it has been approved by the bureau of buildings.

158. The material and labor for the tests must be furnished by the plumber. *Where the peppermint test is used, two ounces of oil of peppermint must be provided for each line up to five stories and basement in height, and for each additional five stories or fraction thereof one additional ounce of peppermint must be provided.*

## XV.—PLUMBING IN TENEMENT HOUSES.

159. All sections or parts of sections of the tenement house law relating to plumbing and drainage of tenement houses are to be observed, and are hereby made a part of these rules and regulations.

## XVI.—GAS PIPING AND FIXTURES.

160. Hereafter the gas piping and fixtures in all new buildings and all alterations and extensions made to the gas piping or fixtures in old buildings must be done in accordance with the following rules, which are made in accordance with section 89 of the building code.

For additional requirements of public buildings, theaters and places of assembly, see Part XXI of the building code.

161. Before the construction or alteration of any gas piping in any building or part of any building, a permit must be obtained from the superintendent of buildings. This permit will be issued only to a registered plumber *and in conjunction with the permit for plumbing and drainage.* Application must include all floor plans complete, showing each and every outlet and the number of burners to go on each outlet. [Before beginning work.] Small alterations may be made by notifying the bureau of buildings, using the same blank forms provided for alterations and repairs to plumbing.

162. *Before any fixtures are connected with the gas piping, a permit must be obtained from the superintendent of buildings, application for same to be made on forms furnished by the bureau of buildings.*

163. All gas pipe shall be of the best quality wrought iron and of the kind classed as standard pipe, and shall weigh according to the following scale:

| Diameters. | Weights per linear foot. |
|---|---|
| ⅜ inch | 0.56 pound |
| ½ inch | 0.85 " |

TABLE—CONTINUED.

| Diameters. | Weights per linear foot. |
|---|---|
| ¾ inch | 1.12 " |
| 1 inch | 1.67 " |
| 1¼ inches | 2.24 " |
| 1½ inches | 2.68 " |
| 2 inches | 3.61 " |
| 2½ inches | 5.75 " |
| 3 inches | 7.54 " |
| 3½ inches | 9.00 " |
| 4 inches | 10.66 " |

No pipe allowed of less than ⅜ inch in diameter.

164. All fittings (excepting stop cocks or valves) shall be of malleable iron. [All bends or angles in the piping system must be made by means of fittings. The bending of pipes will not be permitted.]

165. There shall be a heavy brass straightaway cock or valve on the service pipe immediately inside the front foundation wall.

Iron cocks or valves are not permitted.

166. Where it is not impracticable so to do, all risers shall be left not more than five feet from front wall.

167. No pipe shall be laid so as to support any weight (except fixtures) or be subjected to any strain whatsoever. All pipe shall be properly laid and fastened to prevent becoming trapped, and shall be laid, when practicable, above timbers or beams instead of beneath them. Where running lines or branches cross beams they must do so within thirty-six inches of the end of the beams, and in no case shall the said pipes be let into the beams more than two inches in depth. Any pipe laid in a cold or damp place shall be properly dripped, protected and painted with two coats of red lead and boiled oil or tarred.

168. No gas pipe shall be laid in cement or concrete unless the pipe and channel in which it is placed are well covered with

tar, nor within six inches of an electric wire excepting where they immediately join outlets.

169. All drops must be set plumb and securely fastened, each one having at least one solid strap. Drops and outlets less than ¾ of an inch in diameter shall not be left more than one inch below plastering, center-pieces, or woodwork.

170. All outlets and risers shall be left capped until covered by fixtures.

171. No unions or running threads shall be permitted. Where necessary to cut out or repair leaks or make extensions, pipe shall be again put together with right and left couplings.

172. No gasfitters' cement shall be used, except in putting fixtures together.

173. All gas brackets and fixtures shall be placed so that the burners of same are not less than three feet below any ceiling or woodwork, unless the same is properly protected by a shield, in which case the distances shall not be less than eighteen inches.

No swinging or folding gas brackets shadd be placed against any stud partition or woodwork.

No gas bracket on any lath and plaster partition or woodwork shall be less than five inches in length, measured from the burner to the plaster surface or woodwork.

Gas lights placed near window curtains or any other combustible material shall be protected by a proper shield.

174. Gas outlets for burners shall not be placed under tanks, back of doors or within four feet of any meter.

175. All buildings shall be piped according to the following scale:

| Diameter. | Length. | Burners. |
|---|---|---|
| ⅜ inch | 26 feet | 3 |
| ½ " | 36 " | 6 |
| ¾ " | 60 " | 20 |
| 1 " | 80 " | 35 |
| 1¼ " | 110 " | 60 |

TABLE—CONTINUED.

| Diameter. | | Length. | | Burners. |
|---|---|---|---|---|
| 1½ | " | 150 | " | 100 |
| 2 | " | 200 | " | 200 |
| 2½ | " | 300 | " | 300 |
| 3 | " | 450 | " | 450 |
| 3½ | " | 500 | " | 600 |
| 4 | " | 600 | " | 750 |

176. Outlets for gas ranges shall have a diameter not less than required for six burners, and all gas ranges and heaters shall have a straightaway cock on service pipe.

177. When brass piping is used on the outside of plastering or woodwork it shall be classed as fixtures.

178. All brass tubing used for arms and stems of fixtures shall be at least No. 18 standard gauge and full size outside, so as to cut a full thread. All threads on brass pipe shall screw in at least 5-16 of an inch. All rope or square tubing shall be brazed or soldered into fittings and distributers, or have a nipple brazed into the tubing.

179. All cast fittings, such as cocks, swing joints, double centers, nozzles, etc., shall be extra heavy brass. The plugs of all cocks must be ground to a smooth and true surface for their entire length, be free from sandholes, have not less than ¾ of an inch bearing (except in cases of special design), have two flat sides on the end for the washer, and have two nuts instead of a tail screw. All stop pins to keys or cocks shall be screwed into place.

180. After all piping is fitted and fastened and all outlets capped up, there must be applied by the plumber, in the presence of an inspector of the bureau of buildings, a test with air to a pressure equal to a column of mercury six inches in height, and the same to stand for five minutes; only mercury gauge shall be used. No piping shall be covered up, nor shall any fixtures, gas, heater or range be connected thereto until a card showing the approval of this test has been issued by the superintendent of buildings. And, again, when all fixtures are hung, a similar

test shall be applied in exactly the same manner, excepting that one burner fixture will be omitted to permit of applying a pump and gauge. On the inspector's report of this test as above, a final approved card in duplicate will be issued by the superintendent of buildings.

181. No meter will be set by any gas company until a certificate is filed with them from the bureau of buildings certifying that the gas pipes and fixtures comply with the foregoing rules.

182. When for any reason it may be impracticable to comply strictly with the foregoing rules, the superintendent of buildings shall have power to modify their provisions so that the spirit and substance thereof shall be complied with. Such modifications shall be indorsed upon the permit over the signature of the superintendent of buildings.

## *II.—THE N. Y. SANITARY CODE.*

### Dwellings, Lodging Houses and Other Buildings, Ventilation, Drainage and Plumbing.

Sec. 16. No person shall hereafter erect, or cause to be erected, or converted to a new purpose by alteration, any building or structure or change the construction of any part of any building by addition or otherwise, so that it, or any part thereof, shall be inadequate or defective in respect to strength, ventilation, light, sewerage, or any other usual, proper, or necessary provision or precaution for the security of life and health; and no person shall make or use a smoke house or room or apparatus for smoking meat, without a permit from the board of health, and subject to the conditions thereof; nor shall the builder, owner, lessee, tenant or occupant of any such, or of any other building or structure, cause or allow any matter or things to be or to be done in or about any such building or structure dangerous or prejudicial to life or health.

Sec. 17. No owner or lessee of any building, or any part thereof, shall lease or let or hire out or allow the same or any portion thereof to be occupied by any person, or allow any one to dwell or lodge therein, except when said building or such parts thereof are sufficiently lighted, ventilated, provided and accommodated, and are in all respects in that condition of cleanliness and wholesomeness for which this code or any law of this state provides, or in which they or either of them require any such premises to be kept. Nor shall any such person rent, let, hire out or allow, having power to prevent the same, to be used as or for a place of sleeping or residence, any portion or apartment of any building, which apartment or portion has not at least two feet of its height and space above the level of every part of the sidewalk and curbstone of any adjacent street, nor of which the floor is damp by reason of water from the ground, or which is impregnated or penetrated by any offensive gas, smell

or exhalation prejudicial to health. But this section shall not prevent the leasing, renting or occupancy of cellars or rooms less elevated than aforesaid, and as a part of any building rented or let, when they are not let or intended to be occupied or used by any person as a sleeping apartment, or as a principal or sole dwelling apartment.

Sec. 18. No person having the right and power to prevent the same shall knowingly cause or permit any person to sleep or remain in any cellar, or in any bathroom, or in any room where there is a water closet, or in any place dangerous or prejudicial to life or health, by reason of a want of ventilation or drainage, or by reason of the presence of any poisonous, noxious, or offensive odors or substance, or otherwise.

Sec. 19. No owner, lessee, or keeper of any tenement house, boarding house, lodging house, dwelling house or manufactory shall provide, or cause to be provided, for the accommodation thereof and for the use of the tenants, boarders, lodgers, dwellers or workers thereat, adequate privies or water closets, and the same shall be properly ventilated, and shall at all times be kept in such cleanly and wholesome condition as not to be offensive or dangerous or detrimental to life or health. And no offensive smell or gases, from or through any outlet or sewer, or through any such privy or water closet, shall be allowed by any person aforesaid to pass into such house or any part thereof, or into any other house or building.

Sec. 23. All filthy and dirty walls and ceilings of any building, including the walls and ceiling of the cellar thereof, shall be thoroughly cleaned and whitewashed whenever required by the board of health.

Sec. 24. The roofs and skylights of all buildings shall be kept in a condition of good repair so that rain water shall not enter the building.

## Sewerage and Drainage.

Sec. 27. Every person using, making, or having any drain,

soil pipe, passage or connection between any sewer (or with any river or other body of water) and any ground, building, erection, or place of business, and in like manner every owner or tenant of any grounds, buildings or erections, and every person interested in such place of business or the business thereat, and in like manner every board, department, officer, and person (to the extent of the right and authority of each), shall cause and require such drain, soil pipe, passage and connection to be at all times adequate for its purpose, and to convey and allow, freely and entirely, to pass whatever enters or should enter the same; and no change shall be made of the drainage, sewerage, or sewer connection of any other house or premises, unless at least thirty days' notice thereof in writing shall have been previously given to this department, and to the owner or occupant of the premises affected by such change.

Sec. 29. No brick, sheet metal, or earthenware material or chimney flue shall be used as a sewer ventilator, or to ventilate any trap, drain, soil or waste pipe.

Sec. 30. The soil, waste and vent pipes in an extension to any building must be extended above the roof of the main building if within thirty feet of the front or rear windows of the main building or of an adjoining building, or if so located as to cause a nuisance.

Sec. 31. All joints in iron drain pipes, soil and waste pipes, must be filled with oakum and lead and hand caulked so as to make them gas-tight. All connections of lead with iron pipes must be made with a brass sleeve or ferrule of the same size as the lead pipe, put in the hub of the branch of the iron pipe, and caulked with lead. The lead pipe must be attached to the ferrule by a wiped or overcast joint. All connections of lead waste and vent pipes shall be made by means of wiped joints.

Sec. 32. All house drains, waste, soil and vent pipes, traps, and water pipes in any building and premises shall at all times be kept in good order and repair so that no gases or odors shall escape therefrom and so that the same shall not leak.

Sec. 33. Every water closet, urinal, sink, basin, wash tray,

bath and every tub or set of tubs and hydrant waste pipe must be separately and effectively trapped; except where a sink and wash tubs immediately adjoin each other, in which case the waste pipe from the tubs may be connected with the inlet side of the sink trap. Traps must be placed as near the fixtures as practicable, and in no case shall a trap be more than two feet from the fixture. In no case shall the waste from a bath tub or other fixture be connected with a water closet trap. No trap vent pipe shall be used as a waste or soil pipe.

Sec. 34. No drain pipe from a refrigerator shall be connected with the soil or waste pipe, but it shall discharge into a properly trapped, sewer-connected, water-supplied, open sink. No overflow pipe from a tank shall discharge into any soil or waste pipe or water closet trap, or into the drain or sewer, but it may discharge upon the roof or into an open water-supplied tank.

Sec. 35. Rain water leaders shall be sound, tight and adequate for their purpose and shall not be used as soil, waste or vent pipes, or be connected therewith; nor shall any soil, waste or vent pipe to be used as a leader. When within the house, the leader must be of cast iron, with leaded joints; when outside the house and connected with the house drain it must be trapped beneath the ground or just inside of the wall, the trap being arranged in either case so as to prevent freezing. In every case where a leader opens near a window or a lightshaft, it must be properly trapped at its base. The joint between a cast iron leader and the roof must be made gas and water tight by means of a brass ferrule and lead or copper pipe properly connected.

Sec. 36. The waste or soil pipe in every lodging house, or other dwelling in The City of New York, shall be ventilated by extending the same by means of a pipe of the same size to the height of not less than two feet above the roof of the building.

Sec. 37. No privy vault, or cesspool, shall be allowed to remain on any premises, or shall be built in The City of New York, unless when unavoidable. The sides and bottom of every privy vault, cesspool, or school sink in The City of New York must be impermeable, and secure any saturation of the walls or

the ground above the same. No water closet or privy shall be constructed without adequate provision for the effectual and proper ventilation and cleansing thereof.

Sec. 38. No person, persons, company or corporation shall cause, permit or allow any sewage, drainage, factory refuse or any foul or offensive liquid or other material to flow, leak, escape or be emptied or discharged into the waters of any river, stream, canal, harbor, bay or estuary, or into the sea within the city limits, excepting under low water mark, and in such manner and under such conditions that no nuisance can or shall be caused thereby or as a result thereof.

## *QUESTIONS ON THE TENEMENT-HOUSE LAW.*

NOTE.—The figures after each question refer to sections of the law.

1. Define following terms: "tenement-house," yard, court, shaft, public hall, stair-hall, basement, cellar, fire-proof tenement-house. 2.

2. How do you measure the "height" of a house? Sec. 2, No. 12.

3. What is a "studio" building and what are the provisions about same? 5.

4. What are the provisions about wooden houses? 31 and 34 and 38.

5. What combustible articles are not allowed to be kept in tenements? 39.

6. What are the provisions about bakeries and fat boiling? 40.

7. What other businesses are restricted, what are the restrictions? 41.

8. What are the other prohibitive uses for tenements? 109.

9. When may a rear house be built? 61 and 60.

10. What are the conditions of living in basements and cellars of old and of new houses? Also conditions of janitor's apartments? 90, 95 and 96.

11. What are the provisions about concreting, grading and draining shafts, courts, areas and yards? 91.

12. What are the provisions about water supply in old and new houses? 90 and 103.

13. Give provisions about water closets in new houses. 93.

14. What are the provisions about school sinks and water closets in old houses? 99.

15. Give rules about exposure of plumbing pipes, also sinks and water closets. 94, 97, 98.

16. Give provisions about cellar floors, walls and ceilings. 100 and 101.

17. Give provisions about walls of courts and shafts, also doors to them. 106.

18. Why must new paper not be put over old paper? 107.

19. What is the cubic space allowed per person? 111.

20. When must there be a janitor upon premises? 110.

21. What is the per cent. of lot which may be occupied in tenements? 50.

22. What may be the height of new houses on Riverside Drive? 51 and 7.

23. What are the minimum sizes of all yards, courts—inner and outer? 50-59.

24. What are the minimum sizes of shafts in new and old houses? 79 and 75.

25. Give provisions about sizes of various yards. 52-55.

26. Give provisions about sizes of outer courts. 57 and 59.

27. Give provisions about sizes of inner courts. 58 and 59.

28. Give sizes of rooms and alcove rooms. 64-65.

29. Give provisions about light, ventilations and windows in old houses. 73.

30. Give provisions about light and ventilation and windows in new houses. 62, 63.

31. Give provisions about windows and lighting of public halls, stair halls, in new and old houses. 66, 67, 68, 74, 76.

32. Give provisions about skylight and ventilators. 77.

33. What are the provisions about privacy in new houses? 69.

34. When are fire-proof tenements required? 15.

35. Give provisions about bulkheads, when and why required? 17.

36. Give provisions about entrance and stair halls. 18, 22, 23.

37. Give all provisions about stairs and stairways in all buildings. 19, 20, 21, 33, 35.

38. Give provisions about "first tier of beams." 24.

39. Give provisions about partitions. 25.

40. Give provisions about cellar stairs in fire and non-fire-proof houses. 26-7.

41. Give provisions about cellar entrance and closet under stairs. 28-29.

42. Give provisions about bulkheads, scuttles, ladders and stairs. 32.

43. What are the provisions about construction of shafts? 36.

44. How should the space behind wainscoting be made? 37.

45. In what houses and under what conditions may there be no fire-escapes? 16.

46. Where are fire-escapes to be placed? 16.

47. No fire-escapes shall be deemed sufficient unless what? 16.

48. What are the provisions about fire-escapes in old houses? 16.

49. What are the provisions about fire-escapes in new houses? 16.

50. Give in detail construction and minimum size of parts of fire-escapes.

## GLOSSARY OF TECHNICAL TERMS USED IN THE TENEMENT HOUSE ACT.

*Abutment.*—Supporting structure to sustain lateral pressure.

*Angle Iron.*—Bars of iron in the form of an angle.

*Basement.*—A story partly but not more than half below the level of the earth.

*Banister.*—One of the uprights supporting the handrail of stairs.

*Battens.*—Narrow strips fastened across parallel slats to secure them.

*Brackets.*—A right-angled triangle, one short side of which is applied to the wall vertically.

*Bulkhead.*—Wooden structure over stair well on roof.

*Cellar.*—A story more than half below the curb level.

*Court.*—An open unoccupied space, other than a yard, on the same lot with a tenement house.

Inner court is one not extending to street or yard.

Outer court is one extending to street or yard.

Street court is one extending to street.

Yard court is one extending to yard.

*Facade.*—Exterior face of building.

*Fire Limits.*—Area of city where frame and wooden structures are not allowed.

Fire limits in Manhattan—Battery, North River, 165 W., to a point 100 feet west of the westerly side of Broadway; thence northerly on a line drawn 100 feet west of the westerly side of Broadway to the bulkhead line of the

Harlem River; thence southerly along the bulkhead line of the Harlem River to the Bronx Kills; thence southerly along the bulkhead line of the Bronx Kills to the East River; thence southerly along the East River, passing to the east of Blackwell's Island, and thence continuing by the pier head line of the river to the Battery. For fire limits of Bronx, Brooklyn, etc., see Building Code.

*Fireproof* tenement house is one the walls of which are constructed of brick, iron, stone or other hard incombustible material, and in which there are no wooden beams or lintels, and in which the floors, roofs, stair halls and public halls are built entirely of brick, stone, iron or other hard, incombustible material, and in which no woodwork or other inflammable material is used in any of the partitions, furrings or ceilings.

*Flanges.*—A projecting rim, rib, or edge used to strengthen an object to keep it in place.

*Furring.*—Narrow strips of wood nailed in partitions and walls in order to secure a smooth surface for lathing.

*Goose-Neck Ladder.*—One part of ladder being bent in shape of goose neck.

*Intake.*—A duet or flue serving to let in fresh air into an exclusive shaft or space.

*Lath.*—A thin strip of wood, as one of a number nailed to studs and serving to support a coat of plaster.

*Lattice.*—Openwork of metal or wood formed by crossing or interlacing strips or bars.

*Lintels.*—The horizontal top piece of a door or window opening.

*Ratio Safe Load of* 4 *to* 1.—The factor of safety. If the balcony is constructed to bear a load of 80 lbs. per sq. foot, a safe load at a ratio of 4 to 1 means it should be able to sustain 4 times as heavy a weight or 320 lbs. per sq. foot.

*Risers.*—A vertical part of a step or stair.

*Rungs.*—A round of a ladder.

*Sleepers.*—Heavy beams of wood used for timber supports.

*Staggered.*—To place, as rivets or other articles, in rows, the articles in one row alternating with the spaces in the other.

*Standards, or filling-in-bars.*—An upright bar used to fill in the space between the top and bottom rail of balcony in fire escapes.

*Strings.*—The inclined bars or pieces set edgewise as a support for the steps of a stairway.

*Studs.*—One of the intermediate posts, as in a wooden partition, to which laths are nailed.

*Studding.*—Studs or joists collectively.

*Soffit.*—The underside of a staircase.

*Transom.*—A small ventilating window above a door.

*Treads.*—The upper level portion of a step.

*Wainscoting.*—A lining of an inner wall, usually of wood, usually paneled, and generally extending a few feet from the floor.

*Winders.*—A winding staircase.

*Wire Glass.*—Glass so manufactured that a wire netting is embedded within the glass; useful in case of fire, as only small parts of such glass are breaking off at one time.

*Uprights.*—Timbers or bars having a vertical position.

*Yards.*—An unoccupied open space on the same lot with a tenement house, between the extreme line of the house and the rear line of the lot.

# THE TENEMENT HOUSE LAW OF 1909.

Article 1. Short title; definitions (Sections 1, 2).
2. General provisions (Sections 3—*9).
3. Protection from fire (Sections 15—41).
4. Light and ventilation (Sections 50—79).
5. Sanitary provisions (Sections 90—*110).
6. Requirements and remedies (Sections 120—128).
7. Registry of names and service of papers (Sections 140—144).
8. Prostitution in tenement houses (Sections 150—160).
9. Application; laws repealed; when to take effect (Sections 170—172).

*So in original.

## *ARTICLE I.*

### SHORT TITLE; DEFINITIONS.

Section 1. Short title.
2. Definitions.

### SHORT TITLE.

Section 1. This chapter shall be known as the "Tenement House Law."

### DEFINITIONS.

Sec. 2. Certain words in this chapter are defined for the purposes thereof as follows:

(1.) A "tenement house" is any house or building, or portion thereof, which is rented, leased, let or hired out, to be occupied, or is occupied as the home or residence of three families or more living independently of each other, and doing their cooking upon the prem-

ises, or by more than two families upon any floor, so living and cooking, but having a common right in the halls, stairways, yards, water closets or privies, or some of them.

(2.) A "yard" is an open unoccupied space on the same lot with a tenement house, between the extreme rear line of the house and the rear line of the lot.

(3.) A "court" is an open unoccupied space, other than a yard, on the same lot with a tenement house. A court not extending to the street or yard is an inner court. If it extends to the street it is a street court. If it extends to the yards it is a yard court.

(4). A "shaft" includes exterior and interior shafts, whether for air, light, elevator, dumbwaiter, or any other purpose. A "vent shaft" is one used solely to ventilate or light a water closet compartment or bathroom.

(5.) A "public hall" is a hall, corridor or passageway not within an apartment.

(6.) A "stair hall" includes the stairs, stair landings and those portions of the public halls through which it is necessary to pass in going between the entrance floor and the roof.

(7.) A "basement" is a story partly but not more than one-half below the level of the curb.

(8.) A "cellar" is a story more than one-half below the level of the curb.

(9.) A "fireproof tenement house" is one the walls of which are constructed of brick, stone, iron or other hard incombustible material, and in which there are no wood beams or lintels, and in which the floors, roofs, stair halls and public halls are built of brick, stone, iron or other hard incombustible material, and in which no woodwork or other inflammable materials is used in any of the partitions, furrings or ceilings. But this definition shall not be construed as prohibiting, elsewhere than in the stair halls or entrance halls, the use of wooden flooring on top of the fireproof floors, or the use of wooden sleepers, nor as prohibiting wooden handrails and hard-wood treads such as described in Section Twenty-two of this chapter.

(10.) The word "shall" is always mandatory, and not directory,

and denotes that the house shall be maintained in all respects according to the mandate, as long as it continues to be a tenement house.

(11.) Wherever the words "charter," "ordinances," regulations," "department of buildings," "department of health," "department of water supply," "fire department," "department charged with the enforcement of this chapter," "corporation counsel," "city treasury" or "fire limits" occur in this chapter they shall be construed as if followed by the words "of the city in which the tenement house is situated." Whenever the words "is occupied" are used in this chapter, applying to any building, such words shall be construed as if followed by the words "or is intended, arranged or designed to be occupied."

(12) The "height" of a tenement house in the perpendicular distance measured in a straight line from the curb level to the highest point of the roof beams, the measurements in all cases to be taken through the center of the facade of the house. Where a building is on a corner lot and there is more than one grade or level, the measurements shall be taken through the center of the facade on the street having the greatest grade.

## *ARTICLE II.*

### General Provisions.

Section 3. Buildings converted or altered.
4. Alterations and change in occupancy.
5. Application to certain studio buildings.
6. Application to Buffalo.
7. Tenement house fronting on a part of Riverside Drive in New York City.
8. Building regulations.
9. Penalties.
10. Time for compliance.

### Buildings Converted or Altered.

Sec. 3. A building not erected for use as a tenement house,

if hereafter converted or altered to such use, shall thereupon become subject to all the provisions of this chapter affecting tenement houses herafter erected. A tenement house not now completed, but the excavation for which shall have been commenced in good faith on or before the first day of June, nineteen hundred and one, after approval of the plans therefor by the department of buildings, and the first tier of beams of which shall have been set on or before the first day of August, nineteen hundred and one, shall be subject only to the provisions of this chapter affecting now existing tenement houses; provided that the plans for said house were filed in said department on or before the tenth day of April, nineteen hundred and one, and were in accordance with the laws in force at the time of filing, and that the building is built in accordance with such laws.

### Alterations and Change in Occupancy.

Sec. 4. No tenement house shall at any time be altered so as to be in violation of any provision of this chapter. If any tenement house or any part thereof is occupied by more families than provided in this chapter, or is erected, altered or occupied contrary to law, such tenement house shall be deemed an unlawful structure, and the department charged with the enforcement of this chapter may cause such building to be vacated. And such building shall not again be occupied until it or its occupation, as the case may be, has been made to conform to the law.

### Application to Certain Studio Buildings.

Sec. 5. A studio building erected after May 1, nineteen hundred an one, and prior to October first, nineteen hundred and five, in a city of the first class upon a lot not less than seventy-five feet in width by one hundred feet in depth, which building contains not less than fourteen studios, each with a window not less than ten feet in height and ten feet in width, such studio building being occupied and used by three families or more, liv-

ing independently of each other and doing their cooking on the premises, shall be and is hereby declared exempt from the requirements and provisions of sections fifty-one, sixty-four, sixty-six, sixty-seven, sixty-eight, seventy-four, seventy-nine, ninety, subdivision one; ninety-three, ninety-five, one hundred and twenty and one hundred and twenty-one of this chapter.

### Application to Buffalo.

Sec. 6. The provisions of chapter three hundred and thirty-four of the laws of nineteen hundred and one shall not be deemed to have applied to the City of Buffalo before January first, nineteen hundred and two.

### Tenement Houses Fronting on a Part of Riverside Drive in New York City.

Sec. 7. In the case of a tenement house hereafter erected on Riverside Drive or parkway, between One Hundred and Thirty-sixth street and One Hundred and Fiftieth street, in The City of New York, on a corner lot formed by the intersection of a street passing under said drive or parkway, the measurements for determining the height of said house and the number of its stories, may be taken on said drive or parkway; provided, however, that no part of such building which is below the curb level of said drive or parkway is occupied for living purposes, except by the janitor of said building and his family; and provided also that there shall not be more than one story below the level of said drive or parkway, and that said story shall not exceed fifteen feet in height.

### Building Regulations.

Sec. 8. Except as herein otherwise specified, every tenement house shall be constructed and maintained in conformity with the existing law, but no ordinance, regulation or ruling of

any municipal authority shall modify or dispense with any provision of this chapter.

### Penalties.

Sec. 9. All penalties collected under this chapter shall be paid into the city treasury.

### Time for Compliance.

Sec. 10. All alterations required by this chapter upon tenement houses erected prior to April twelfth, nineteen hundred and one, shall be made within one year from said date, or at such earlier period as may be fixed by the departments charged with the enforcement of this chapter.

## *ARTICLE III.*

### Protection from Fire.

Section 15. Fireproof tenement, when required.
16. Fire escapes.
17. Bulkheads.
18. Stairs and public halls.
19. Stairways in non-fireproof buildings.
20. Stairways in fireproof buildings.
21. Stairways and stairs.
22. Stair halls.
23. Entrance halls.
24. First tier of beams.
25. Partitions.
26. Cellar stairs in non-fireproof buildings.
27. Cellar stairs in fireproof buildings.
28. Closet under first story stairs.
29. Cellar entrance.
30. Fire stops.
31. Wooden tenement houses.

32. Scuttles, bulkheads, ladders and stairs.
33. Stair halls, public halls and entrance halls.
34. Alteration of wooden tenement houses.
36. Shafts.
37. Plastering behind wainscoting.
38. Wooden buildings on same lot with a tenement house.
39. Combustible materials.
40. Bakeries and fat boiling.
41. Other dangerous businesses.

### Fireproof Tenement; When Required.

Sec. 15. Every tenement house hereafter erected exceeding six stories or parts of stories in height above the curb level, shall be a fireproof tenement house, nor shall any tenement house be altered so as to exceed such height without being made a fireproof tenement house. A cellar the ceiling of which does not extend more than two feet above the curb level is not a story within the meaning of this section. Where, however, a tenement house hereafter erected is located on a street of which the grade is more than four feet in one hundred, a cellar or basement, the ceiling of which does not extend more than six inches above the highest point of the curb level, is not to be deemed a story within the meaning of this section, provided, however, that no part of such cellar or basement is occupied or arranged to be occupied for living purposes except by the janitor of such building and his family, and provided also that such cellar or basement is the lowest story of such building.

### Fire Escapes.

Sec. 16. Every non-fireproof tenement house hereafter erected, unless provided with fireproof outside stairways directly accessible to each apartment, shall have fire escapes located and constructed as in this subdivision required, except that tenement

houses that are less than four stories in height and which do not also contain accommodations for more than four families in all, may be equipped with such other iron, steel, or wire cable fire escapes as may be approved by the department charged with the enforcement of this chapter. Such escapes must be capable of sustaining two thousand pounds, and be of sufficient length to reach from the top floor to the ground, and with rungs not more than twelve inches apart and not less than fifteen inches in length.

All fire escapes shall open directly from at least one room or private hall in each apartment at each story above the ground floor, other than a bathroom or water closet compartment, and shall not include the window of a stair hall, and such room or private hall shall be an integral part of said apartment and accessible to every room thereof without passing through a public hall. Access to fire escapes shall not be obstructed in any way. No fire escape shall be placed in a court except where required by law for apartments not having a room either on the street or yard as provided in section fifty-six of this chapter. Fire escapes may project into the public highway to a distance not greater than four feet beyond the building line. All fire escapes shall consist of outside open iron or stone balconies and stairways. All balconies shall be not less than three feet in width and shall include at least one window or outside door of each apartment, at each story above the ground floor. All stairways shall be placed at an angle of not more than sixty degrees, with flat open steps not less than six inches in width and twenty inches in length and with a rise of not more than nine inches. The openings for stairways in all balconies shall be not less than twenty-one by twenty-eight inches, and shall have no covers of any kind. The balcony on the top floor, except in the case of a balcony on the street, shall be provided with a stairs or with a goose-neck ladder leading from said balcony to and above the roof and properly fastened thereto. A drop ladder shall be provided from the lowest balcony of sufficient length to reach to a safe landing place beneath. All fire escapes shall be constructed

and erected to safely sustain in all their parts a safe load, and if of iron shall receive not less than two coats of good paint, one in the shop and one after erection. In addition to the foregoing requirements all fire escapes hereafter erected upon tenement houses shall be constructed in accordance with such supplementary regulations as may be adopted by the department charged with the enforcement of this chapter.

2. Every non-fireproof tenement house shall be provided either with fireproof outside stairways, or with fire escapes directly accessible to each apartment without passing through a public hallway. All fire escapes hereafter erected on any tenement house shall be located and constructed as described in subdivision one of this section. The owner of every tenement house shall keep all the fire escapes thereon in good order and repair, and whenever rusty shall have them properly painted with two coats of good paint. No person shall at any time place any incumbrance of any kind before or upon any such fire escape.

### Fire Escapes on Existing Houses.

3. In the case of tenement houses erected prior to April tenth, nineteen hundred and one, fire escapes that are already erected shall be deemed sufficient in the following cases:

(1.) If located on the front or rear wall of the building and properly connected with stairs or stationary ladders with proper openings.

(2.) If located in an outer court at a point distant not more than thirty feet from the outer end of such court and provided such court is not less than five feet in width from wall to wall at any point between such fire escape and the outer end of said court.

(3.) If located in an inner court whose least horizontal dimension is not less than fifteen feet measured from wall to wall.

(4.) If a party-wall balcony on the front or rear wall of the building and there are no doors or openings in the walls

between the two buildings other than windows in fireproof air shafts.

(5.) If a party-wall balcony located in an outer court not more than fifteen feet in length measured from the outer end of such court to the innermost point thereof, and not less than five feet in width from wall to wall at any point between such fire escape and the outer end of said court, and provided also that there are no doors or openings in the walls between the two buildings other than windows in fireproof air shafts.

(6.) If the fire escapes are located on tenement houses that are less than four stories in height and which also do not contain accommodations for more than four families in all, and they are such iron, steel or wire cable fire escapes as are provided for in subdivision one of this section.

But, however, no fire escape shall be deemed sufficient unless the following conditions are complied with:

a. All parts of it shall be of iron or stone.

b. Every apartment above the ground floor in each tenement house shall have a fire escape directly accessible to it without passing through a public hall.

c. All balconies shall be properly connected with each other by adequate stairs or stationary ladders, with openings not less than twenty-one by twenty-eight inches, except in the case of a party-wall balcony as prescribed in groups four and five of this subdivision.

d. All fire escapes shall have proper drop ladders from the lowest balcony of sufficient length to reach a safe landing place beneath.

e. All fire escapes not on the street shall have a safe and adequate means of egress from the yard or court to the street or to the adjoining premises.

f. Prompt and ready access shall be had to all fire escapes, which shall not be obstructed by bath tubs, water-closets, sinks or other fixtures, or in any other way.

All fire escapes that are already erected which do not conform to the requirements of this subdivision may be altered by the

owner to make them so conform in lieu of providing new fire-escapes, but no existing fire-escapes shall be extended or have its location changed except with the written approval of the department charged with the enforcement of this chapter. Where an existing apartment in a tenement house erected prior to April tenth, nineteen hundred and one, is located entirely on a court and has no rooms opening on the street or yard, fire-escapes hereafter provided for such apartments may be located in courts under the same conditions as prescribed for existing fire-escapes in this subdivision. All new ladders that are provided for existing fire escapes shall be constructed in accordance with such regulations as may be adopted by said department.

4. Whenever a non-fireproof tenement house is not provided with sufficient means of egress in case of fire, the department charged with the enforcement of this chapter may order such additional fire-escapes or other means of egress as in its judgment may be necessary.

### Bulkheads.

Sec. 17. Every tenement house hereafter erected shall have in the roof a fireproof bulkhead with fireproof door to the same, and shall have fireproof stairs with a guide or hand rail leading to the roof, except that in tenement houses hereafter erected, which do not exceed four stories and cellar in height, and which also are not occupied or arranged to be occupied by more than two families on any floor, such bulkheads may be of wood covered with metal on both sides. The stairs leading to such bulkheads shall be constructed as specified in sections eighteen to twenty-three of this chapter.

### Stairs and Public Halls.

Sec. 18. Every tenement house hereafter erected shall have at least one flight of stairs extending from the entrance floor to

the roof, and the stairs and public halls therein shall each be at least three feet wide in the clear.

### Stairways in Non-Fireproof Buildings.

Sec. 19. Every non-fireproof tenement house hereafter erected containing over twenty-six apartments or suites of rooms above the entrance story shall also have an additional flight of stairs for every additional twenty-six apartments or fraction thereof; if said house contains not more than thirty-six apartments above the entrance story, in lieu of an additional stairway, the stairs, stair halls and entrance halls throughout the entire building may each be at least one-half wider than is specified in sections eighteen and twenty-three of this chapter.

### Stairways in Fireproof Buildings.

Sec. 20. Every fireproof tenement house hereafter erected containing over thirty-six apartments or suites of rooms above the entrance story shall also have an additional flight of stairs for every additional thirty-six apartments or fraction thereof; but if said house contains not more than forty-eight apartments above the entrance story, in lieu of an additional stairway the stairs, stair halls and entrance halls throughout the entire building may each be at least one-half wider than is specified in sections eighteen and twenty-three of this chapter. And if said house contains not more than eighty-four apartments above the entrance story in lieu of three stairways there may be but two stairways, provided that one of such stairways and the stair halls and entrance halls connected therewith are at least one-half wider than is specified in sections eighteen and twenty-three of this chapter.

### Stairways and Stairs.

Sec. 21. Each flight of stairs mentioned in the last three

sections shall have an entrance on the entrance floor from the street or street court, or from an inner court which connects directly with the street. All stairs shall be constructed with a rise of not more than eight inches and with treads not less than ten inches wide and not less than three feet long in the clear. Winders will not be permitted except in a tenement house provided with a power passenger elevator. Where winders are used, all treads at a point eighteen inches from the strings on the well side shall be at least ten inches wide.

### Stair Halls.

Sec. 22. The stair halls in all non-fireproof as well as fireproof tenement houses hereafter erected shall be constructed as in this section and the following section specified. In tenement houses hereafter erected which either are occupied or are arranged to be occupied by more than two families on any floor, or which exceed four stories and cellar in height, the stair halls shall be constructed of fire-proof material throughout. The risers, strings and banisters shall be of metal or stone. The tread shall be of metal, slate or stone, or of hardwood not less than two inches thick. Wooden hand rails to stairs will be permitted if constructed of hard wood. The floors of all such stair halls shall be constructed of iron or steel beams and fireproof filling, and no wooden flooring or sleepers shall be permitted. In tenement houses hereafter erected which do not exceed four stories and cellar in height and which are not occupied or arranged to be occupied by more than two families on any floor, the stair halls shall either be constructed of iron beams and fireproof filling, or shall be filled in between the floor beams with at least five inches of cement deafening. In such houses the stairs shall be iron or stone, or may be of wood, provided the soffits are covered with metal lath and plastered with two coats of mortar, or with good quality plaster-boards not less than one-half inch in thickness, made of plaster and strong fiber and all joints made true and well-pointed.

2. In every non-fireproof tenement house hereafter erected which either is occupied or is arranged to be occupied by more than two families on any floor, or which exceeds four stories and cellar in height, all stair halls shall be inclosed on all sides with brick walls. The doors opening from such stair halls shall be fireproof and self-closing, and if provided with glass such glass shall be of good quality wire glass. There shall be no transom or movable sash opening from such stair hall to any other part of the house. Each stair hall shall be shut off from all non-fireproof portions of the public halls and from all other non-fireproof parts of the building, on each story, by self-closing fireproof doors, and if glass is used in such doors it shall be of good quality wire glass. In tenement houses hereafter erected which do not exceed four stories and cellar in height, and which also are not occupied or arranged to be occupied by more than two families on any floor, the stair halls shall be inclosed on all sides with brick walls or with partitions of angle iron and fire-proof blocks not less than four inches thick; in tenement houses hereafter erected which do not exceed three stories and cellar in height and which also are not occupied or arranged to be occupied by more than two families on any floor, the stair halls may be inclosed with wooden stud partitions, provided such partitions are covered on both sides with metal lath, or with good quality plaster boards not less than one-half inch in thickness, made of plaster and strong fiber and all joints made true and well-pointed, and provided that the space between the studs is filled in with brick to the height of the floor beams.

### Entrance Halls.

Sec. 23. Every entrance hall in a tenement house hereafter erected shall be at least three feet six inches wide in the clear, from the entrance up to and including the stair inclosure, and beyond this point at least three feet wide in the clear, and shall comply with all the conditions of the preceding sections of this article as to the construction of stair halls, except that in a fire-

proof tenement house hereafter erected it may be inclosed with terra cotta blocks not less than four inches thick and angle iron construction, instead of brick walls. If such entrance hall is the only entrance to more than one flight of stairs, that portion of said hall between the entrance and the first flight of stairs shall be increased one-half in width in every part of each such additional flight of stairs. In every tenement house hereafter erected, access shall be had from the street to the yard, either in a direct line or through a court.

### First Tier of Beams.

Sec. 24. In all non-fireproof as well as fireproof tenement houses hereafter erected five stories or more in height, exclusive of the cellar, the first floor above the lowest cellar, or, if there be no cellar, above the lowest story, shall be constructed fireproof with iron or steel beams and fireproof flooring; and the bottom flanges and all exposed portions of such iron or steel beams below the abutments of the floor arches or filling shall be entirely encased with hardburnt clay or porous terra cotta, or with metal lath properly secured and plastered on the under side. In all non-fireproof tenement houses hereafter erected less than five stories in height where the first floor above the lowest cellar, or, if there be no cellar above the lowest story, is not constructed fireproof with iron or steel beams and fireproof flooring, the cellar ceiling of said tenement house shall be lathed with metal lath and plastered thereon with two coats of brown mortar of good materials, or shall be covered with plaster boards not less than one-half inch in thickness, made of plaster and strong fiber and all joints made true and well-pointed.

### Partitions.

Sec. 25. In all non-fireproof tenement houses hereafter erected, fore and aft stud partitions which rest directly over each other shall run through the wooden floor beams and rest

upon the plate of the partition below, and shall have the studding filled in solid between the uprights to the depth of the floor beams with suitable incombustible materials. In all fireproof tenement houses hereafter erected, all partitions shall rest directly upon the fireproof floor construction, and extend to the fireproof beam filling above.

### Cellar Stairs in Non-Fireproof Buildings.

Sec. 26. In non-fireproof tenement houses hereafter erected which either are occupied or are arranged to be occupied by more than two families on any floor, or which exceed four stories and cellar in height there shall be no inside stairs communicating between the lowest cellar or other lowest story and the floor next above, but such stairs shall in every case be located outside the building, and if inclosed shall be constructed entirely fireproof and be inclosed in a fireproof inclosure with fireproof self-closing doors.

### Cellar Stairs in Fireproof Buildings.

Sec. 27. In every fireproof tenement house herafter erected the stairs communicating between the lowest cellar or other lowest story and the floor next above, if not located underneath the stairs leading to the upper stories, may be placed inside of the said building; provided, that the portion of the cellar or other lowest story into which said stair lead is entirely shut off by fireproof walls from those portions thereof which are used for the storage of fuel, or in which heating appliances, boilers or machinery are located. All openings in such walls shall be provided with self-closing fireproof doors.

### Closet Under First Story Stairs.

Sec. 28. In non-fireproof tenement houses hereafter erected no closet of any kind shall be constructed under any staircase

leading from the first story, exclusive of the cellar, to the upper stories, but such space shall be left entirely open and kept clear and free from incumbrance.

### Cellar Entrance.

Sec. 29. In every tenement house hereafter erected there shall be an entrance to the cellar or other lowest story from the outside of the said building.

### Fire Stops.

Sec. 30. In tenement houses hereafter erected, in all walls where wooden furring is used all the courses of brick from the under side of the floor beams to the top of the same shall project a distance of at least two inches beyond the inside face of the wall so as to provide an effective fire stop; and wherever floor beams run parallel to a wall and wooden furring is used such beams shall always be kept at least two and one-half inches away from the inside line of the wall, and the space between the beams and the wall shall be built up solidly with brickwork from the under side of the floor beams to the top of the same, so as to form an effective fire stop.

### Wooden Tenement Houses.

Sec. 31. Within the fire limits no wooden tenement house shall hereafter be erected, and no wooden building not now used as a tenement house shall hereafter be altered or converted to such use. But outside of the fire limits, tenement houses not exceeding three stories in height, exclusive of the cellar, may be erected of wood, but shall not provide accommodations for, or be occupied, if two stories in height, by more than four families in all, or more than two families on any floor; nor if three stories in height by more than three families in all, nor by more than one family on any floor. No such building shall

exceed forty feet in height, and the side walls of all such buildings shall be brick filled. And such houses, whether of wood or other material, need not comply with the provisions of the following named sections of this chapter: seventeen, nineteen, twenty, twenty-two, twenty-three, twenty-four, twenty-five, twenty-six, twenty-seven, thirty, thirty-six, thirty-seven, and such houses which do not exceed two stories in height need not have either fire escapes or stairs extending to the roof.

Section 2. Section thirty-two of said chapter is hereby amended to read as follows:

### Scuttles, Bulkheads, Ladders and Stairs.

Sec. 32. Every tenement house shall have in the roof a bulkhead or a scuttle which, in tenement houses erected prior to April tenth, nineteen hundred and one, shall be not less than twenty-one inches by twenty-eight inches, and a tenement house erected after that date, not less in size than two feet by thirty inches. All scuttles shall be covered on the outside with metal and shall be provided with stairs of stationary ladders leading thereto and easily accessible to all tenants of the building and kept free from incumbrance, and all scuttles and ladders shall be kept so as to be ready for use at all times. No scuttle shall be located in a room, but all scuttles shall be located in the ceiling of the public hall on the top floor, and access through the scuttle to the roof shall be direct and uninterrupted. If located in a closet, said closet shall open from the public hall and shall not be used as a water-closet compartment or bathroom, and the door to such closet shall be permanently removed, or shall be fastened only by movable bolts or hooks without key-locks. When deemed necessary by the department charged with the enforcement of this chapter, scuttles shall be hinged so as to readily open. Every bulkhead in a tenement house shall have stairs with a guide or handrail leading to the roof, and such stairs shall be kept free from incumbrance at all times. No scuttle and no bulkhead door shall at any time be locked with

a key, but either may be fastened on the inside by movable bolts or hooks. All key-locks on scuttles and on bulkhead doors shall be removed. No stairs leading to the roof in any tenement house shall be removed and replaced with a ladder. Every bulkhead hereafter constructed in a now-existing tenement house shall be constructed as provided in section seventeen of this chapter, except that where the stairs and stair halls in such tenement house are not now of fireproof material such bulkhead may be of wood covered with metal. Any tenement house hereafter increased in height by placing thereon an additional story or stories, or a part of a story, shall be provided with a bulkhead in the roof.

### Stair Halls, Public Halls and Entrance Halls.

Sec. 33. If any tenement house existing on April eleventh, nineteen hundred and one, shall be so altered as to increase the number of rooms therein by thirty-three and one-third per centum or more, or if such building is increased in height so that said building is more than four stories or parts of stories above the curb level, and also the number of rooms is increased therein, the entire stair halls, entrance halls and other public halls of the whole building shall be made to conform to the requirements of sections eighteen to twenty-three, inclusive, of this chapter.

### Alteration of Wooden Tenement Houses.

Sec. 34. No wooden tenement house shall be increased in height so as to exceed three stories, exclusive of the cellar, nor shall it be altered so as to be occupied, if less than three stories, by more than two families on any floor nor by more than four families in all; nor, if three stories, by more than one family on any floor, nor by more than three families in all.

### Stairways.

Sec. 35. In every tenement house all stairways shall be pro-

vided with proper banisters and railings and kept in good repair. In any tenement house any new stairs that may be hereafter constructed leading from the first story to the cellar or basement, shall be entirely inclosed with brick walls, and be provided with fireproof self-closing doors at both the top and the bottom. No public hall or stairs in a tenement house shall be reduced in width so as to be less than the minimum width prescribed in sections eighteen to twenty-three, inclusive, of this chapter.

### Shafts.

Sec. 36. All shafts hereafter constructed in tenement houses shall be constructed fireproof throughout, with fireproof self-closing doors at all openings, at each story, except window openings in vent shafts; and, if they extend to the cellar, shall also be inclosed in the cellar with fireproof walls and fireproof self-closing doors at all openings. In no case shall any shaft be constructed of materials in which any inflammable material or substance enters into any of the component parts. But nothing in this section contained shall be so constructed as to require such inclosure about elevators or dumbwaiters in the wellhole of stairs where the stairs themselves are inclosed in brick or stone walls, and are entirely constructed of fireproof materials as hereinbefore provided.

### Plastering Behind Wainscoting.

Sec. 37. When wainscoting is hereafter placed in any tenement house, or any building in process of alteration into a tenement house, the surface of the wall or partition behind such wainscoting shall be plastered down to the floor line, and any intervening space between said plastering and said wainscot shall be filled in solid with incombustible material.

### Wooden Buildings on Same Lot with a Tenement House.

Sec. 38. No wooden building of any kind whatsoever shall

hereafter be placed or built upon the same lot with a tenement house within the fire limit. And, within the fire limits, no wooden tenement house and no wooden structure or other building on the same lot with a tenement house, shall hereafter be enlarged, extended or raised, except that a wooden extension not exceeding in total area seventy square feet may be added to an existing wooden tenement house, provided such extension is used solely for bath-rooms or water-closets.

### Combustible Materials.

Sec. 39. No tenement house, nor any part thereof, nor of the lot upon which it is situated, shall be used as a place of storage, keeping or handling of any combustible article except under such conditions as may be prescribed by the fire department, under authority of a written permit issued by said department. No tenement house, nor any part thereof, nor of the lot upon which it is situated, shall be used as a place of storage, keeping or handling of any article dangerous or detrimental to life or health, nor for the storage, keeping or handling of feed, hay, straw, excelsior, cotton, paper stock, feathers or rags.

### Bakeries and Fat Boiling.

Sec. 40. No bakery and no place of business in which fat is boiled, shall be maintained in any tenement house which is not fireproof throughout, unless the ceiling, side-walls, and all exposed iron or wooden girders or columns within the said bakery or within said place where fat boiling is done, are made safe by fireproof materials around the same. And there shall be no openings either by door or window, dumbwaiter shafts or otherwise, between said bakery or said place where fat is boiled in any tenement house, and the other parts of the said building, except that in bakeries in which no fat is boiled, and in which no apparatus for fat boiling is present or on the premises, a dumbwaiter communicating between the place where the baking

is done and the store above, may be maintained, if entirely inclosed in a brick shaft with walls not less than eight inches thick, without any openings whatever except one door opening in the bake-shop and one door opening in the bakery store; such openings shall each be provided with a fireproof door so arranged that when one door is open or partly open, the other door shall be entirely closed.

### Other Dangerous Businesses.

Sec. 41. All transoms and windows opening into halls from any portion of a tenement house where paint, oil, spirituous liquors or drugs are stored for the purpose of sale or otherwise, shall be glazed with wire-glass or they shall be removed and closed up as solidly as the rest of the wall; and all doors leading into any such hall from such portion of said house shall be made fireproof.

## *ARTICLE IV.*

### Light and Ventilation.

Section 50. Percentage of lot occupied.
51. Height.
52. Yards.
53. Yards of interior lots.
54. Yards of corner lots.
55. Yard spaces of lots running through from street to street.
56. Courts.
57. Outer courts.
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62. Rooms, lighting and ventilation of.

63. Windows in rooms.
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71. Yards.
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74. Public halls, lighting of.
75. Light and vent shafts in existing buildings.
76. Public halls.
77. Skylights.
78. Chimneys and fireplaces.
79. Vent shafts.

### Percentage of Lot Occupied.

Sec. 50. No tenement house hereafter erected shall occupy more than ninety per centum of a corner lot, or more than seventy percentum of any other lot, except as otherwise provided in section fifty-eight, subdivisions one and two, of this chapter; provided that the space occupied by fire-escapes of the size hereinbefore prescribed shall not be deemed a part of the lot occupied. For the purposes of this section the measurements shall be taken at the ground level, except that where such a building has no basement, and the cellar ceiling is not more than two feet above the curb level, the measurements as to percentage of lot occupied may be taken at the level of the second tier of beams. The provisions of this section shall not apply to a tenement house hereafter erected running through from one street to another street, provided that the lot on which it is situated does not exceed one hundred feet in depth.

### Height.

Sec. 51. The height of no tenement house hereafter erected shall by more than one-half exceed the width of the widest street upon which it stands. Such height shall be the perpendicular distance measured in a straight line from the curb level to the highest point of the roof beams; provided that where there are bulkheads exceeding ten feet in height or exceeding in area ten per centum of the area of the roof, the measurements shall be taken to the top of the bulkhead; but this shall not apply to elevator inclosures not exceeding fifteen feet in height. The measurements in all cases shall be taken through the center of the facade of the house.

No tenement house shall be increased in height so that the building shall exceed by more than one-half the width of the widest street on which it stands.

### Yards.

Sec. 52. Behind every tenement house hereafter erected there shall be a yard extending across the entire width of the lot, and except upon a corner lot, at every point open from the ground to the sky unobstructed, except that fire-escapes or uninclosed outside stairs may project not over four feet from the rear line of the house. The depth of said yard, measured from the extreme rear wall of the house to the rear line of the lot, shall be as set forth in the two following sections.

### Yards of Interior Lots.

Sec. 53. Except upon a corner lot the depth of the yard behind every tenement house hereafter erected sixty feet in height shall be not less than twelve feet in every part. Said yard shall be increased in depth one foot for every additional twelve feet of height of the building, or fraction thereof; and may be decreased in depth one foot for every twelve feet of height of the

building less than sixty feet; but it shall never be less than ten feet in depth in any part.

### Yards of Corner Lots.

Sec. 54. The depth of the yard behind every tenement house hereafter erected upon a corner lot shall be not less than ten feet in every part, provided that where such lot is less than one hundred feet in depth, the depth of the yard may be not less than ten per centum of the depth of such lot, but shall never be less than five feet in every part, nor less than the minimum width of an outer court on the lot line as prescribed by section fifty-seven, subdivision one, of this chapter. Where a tenement house hereafter erected on a corner lot has no basement and the cellar ceiling is not more than two feet above the curb level, said yard may start at the level of the second tier of beams. Where a corner lot is more than fifty feet in width, the yard for that portion in excess of fifty feet shall conform to the provisions of section fifty-three of this chapter.

### Yard Spaces of Lots Running Through from Street to Street.

Sec. 55. Wherever a tenement house hereafter erected is upon a lot which runs through from one street to another street, and said lot is not less than seventy feet nor more than one hundred feet in depth, there shall be a yard space through the center of the lot midway between the two streets, which space shall extend across the full width of the lot and shall never be less than twelve feet in depth from wall to wall, and shall be increased in depth as prescribed in section fifty-three of this chapter. But where such building has no basement and the cellar ceiling is not more than two feet above the curb level, such yard space may start at the level of the second tier of beams. Where such lot is over one hundred feet in depth such yard space shall be left through the center of the lot midway between the two streets, and shall extend across the entire width

of the lot, and shall not be less than twenty-four feet in depth from wall to wall, and shall be increased in depth as prescribed in section fifty-three of this chapter. Where a single tenement house hereafter erected runs through from one street to another street, and also occupies the entire block, no yard need be provided. Where a single tenement house hereafter erected is situated on a lot formed by the intersection of two streets at an acute angle, the yard of the said house need not extend across the entire width of the lot, provided that it extends to a point in line with the middle line of the block.

### Courts.

Sec. 56. No court of a tenement house hereafter erected shall be covered by a roof or skylight, but every such court shall be at every point open from the ground to the sky unobstructed, except as hereinafter otherwise provided, and shall conform to the requirements of sections fifty-seven, fifty-eight and fifty-nine; provided, that an apartment not containing any room fronting upon the street or yard shall have a fire escape in a court, projecting not more than four feet from the wall of the house. Such fire escape shall directly connect at the bottom of such court with a fireproof passageway, not less than three feet wide and seven feet high, leading in a straight and direct line to the street.

### Outer Courts.

Sec. 57. 1. Where one side of an outer court is situated on the lot line, the width of the said court, measured from the lot line to the opposite wall of the building, for tenement houses sixty feet in height shall be not less than six feet in any part; and for every twelve feet of increase or fraction thereof in height of the said building, such width shall be increased six inches throughout the entire height of said court; and for every twelve feet of decrease in the height of the said building below

sixty feet, such width may be decreased six inches. Wherever an outer court exceeds sixty-five feet in length and does not extend from the street to the yard, the entire court shall be increased in width one foot for every additional thirty feet or fraction thereof in excess of sixty-five feet. Except that in tenement houses hereafter erected not exceeding four stories and cellar in height and which also are not occupied or arranged to be occupied by more than eight families in all, or by more than two families on any floor, and in which also each apartment extends through from the street to the yard, the width of an outer court situated on the lot lines shall not be less than four feet in any part, provided that the length of such outer court does not exceed thirty-six feet.

2. Where an outer court is situated between wings or parts of the same building or between different buildings on the same lot, the width of the said court, measured from wall to wall for tenement houses sixty feet in height shall not be less than twelve feet in any part; and for every twelve feet of increase or fraction thereof in the height of the said building, such width shall be increasd one foot throughout the entire height of the said court; and for every twelve feet of decrease in the height of the said building below sixty feet, such width of the said court may be decreased one foot. Wherever an outer court exceeds sixty-five feet in length, the entire court shall be increased in width two feet for every additional thirty feet or fraction thereof in excess of sixty-five feet. Except that in tenement houses hereafter erected not exceeding four stories and cellar in height and which also are not occupied or arranged to be occupied by more than eight families in all, or by more than two families on any floor, and in which also each apartment extends through from the street to the yard, the width of an outer court situated between wings or parts of the same building, or between different buildings on the same lot, measured from wall to wall, shall be not less than eight feet in any part provided that the length of said outer court does not exceed thirty-six feet.

3. Wherever an outer court changes its initial horizontal di-

rection, or wherever any part of such court extends in a direction so as not to receive direct light from the street or yard, the length of such portion of said court shall never exceed the width of said portion; such length to be measured from the point at which the change commences. Wherever an outer court is less in depth than the minimum width prescribed by this article, then its width may be equal to, but not less than its depth, provided that such width is never less than four feet in the clear. This exception shall also apply to each offset or recess in outer courts. And no window except windows of water closet compartments, bathrooms or hall shall open upon any offset or recess less than six feet in width.

### Inner Courts.

Sec. 58. (1) Where one side of an inner court is situated on the lot line, the width of the said court measured from the lot line to the opposite wall of the building, for tenement houses sixty feet in height shall not be less than twelve feet in any part, and its other horizontal dimension shall not be less than twenty-four feet in any part; and for every twelve feet of increase or fraction thereof in the height of the said building, such width shall be increased six inches throughout the entire height of said court, and the other horizontal dimension shall be increased one foot throughout the entire height of said court; and for every twelve feet of decrease in the height of the said building below sixty feet, such width may be decreased six inches and the other horizontal dimension may be decreased one foot. Except that in tenement houses hereafter erected not exceeding four stories and cellar in height, and which also are not occupied or arranged to be occupied by more than eight families in all, or by more than two families on any floor, and in which also each apartment extends through from the street to the yard, and which also do not occupy more than seventy-two per centum of the lot, in the case of an interior lot, the width of an inner court situated on the lot line measured from the lot line to the opposite wall of the

building shall be not less than eight feet in any part, and its other horizontal dimension shall not be less than fourteen feet in any part. Except also that in such tenement houses which do not exceed three stories and cellar in height, and which also are not occupied, or arranged to be occupied, by more than six families in all, or by more than two families on any floor, a portion of such inner court may be occupied by a bathroom extension, provided that such extension has no window facing an opposite building, and that it does not occupy a portion of such court is never less than three and one-half feet in width. In such in length, and that between such extension and the lot line the court is never less than three and one-half feet in width. In such last named tenement houses which do not occupy more than sixty-five per centum of the lot, in the case of an interior lot, where an inner court for its entire length immediately adjoins an existing inner court of equal or greater size in an adjoining building or adjoining such court in an adjoining building actually in course of construction at the same time, the width of such inner court measured from the lot line to the opposite wall of the building shall be not less than four feet in any part, and not less than eight feet from wall to wall, and its other horizontal dimension shall be not less than twelve and one-half feet.

(2) Where an inner court is not situated upon the lot line, but is inclosed on all four sides, the least horizontal dimensions of the said court for tenement houses sixty feet in height shall not be less than twenty-four feet; and for every twelve feet of decrease in the height of the said building below sixty feet, the horizontal dimensions of the said court may be decreased one foot in each direction. Except that in tenement houses hereafter erected not exceeding four stories and cellar in height and which are not occupied or arranged to be occupied by more than eight families in all, or by more than two families on any floor, and in which also each apartment extends through from the street to the yard, and which also do not occupy more than seventy-two per centum of the lot in the case of an interior lot, the least horizontal dimension of an inner court not situated on

the lot line, but inclosed on all four sides, shall not be less than fourteen feet. Except also that in such tenement houses which do not exceed three stories and cellar in height and which also are not occupied, or arranged to be occupied, by more than six families in all, or by more than two families on any floor, and which do not occupy more than sixty-five per centum of the lot, in the case of an interior lot, the width of such inner court shall not be less than eight feet in any part, and its other horizontal dimension shall not be less than twelve and one-half feet. In inner courts which are not less than ten feet wide in any part, offsets and recesses will be permitted, but where the depth of such offset or recess is less than the minimum width prescribed, then the width of said offset or recess may be equal to but not less than its depth, provided that such width is never less than four feet in the clear. And no window except windows of water closet compartments, bathrooms or halls shall open upon any offset or recess less than six feet in width.

(3) Every inner court shall be provided with one or more horizontal intakes at the bottom. Such intakes shall always communicate directly with the street or yard, and shall consist of a passageway not less than three feet wide and seven feet high which shall be left open, or if not open there shall always be provided in said passageway open grilles or transoms of a size not less than five square feet each, and such open grilles or transoms shall never be covered over by glass or in any other way. There shall be at least two such grilles or transoms in each such passageway, one at the inner court and the other at the street or yard, as the case may be.

### Outer and Inner Courts.

Sec. 59. Nothing contained in the foregoing sections concerning outer and inner courts shall be construed as preventing windows at the angles of said courts, provided that the running length of the wall containing such windows does not exceed six feet. Except that in outer or inner courts of a less size than the

minimum prescribed for tenement houses sixty feet in height, the running length of the wall containing windows in the angles of said courts, shall not exceed four feet. Nothing in this section so contained shall be construed so as to permit the reduction of any inner court by cutting off the corners thereof when such court is less than eight feet in width, measured from the lot line to the opposite wall of the building. In construing said sections the height of the building is to be measured from the curb level to the top of the highest wall inclosing or forming such court. When a tenement house hereafter erected exceeding three stories in height has no basement and the cellar ceiling is not more than two feet above the curb level, the courts mentioned in the seven preceding sections may start at the level of the second tier of beams. Where an inner court stands at the second tier of beams, a portion of such court having a least horizontal dimension equal to the minimum width of the court as prescribed by section fifty-eight, subdivisions one and two, of this chapter, shall be left unbuilt upon, and shall communicate directly with the intake required by section fifty-eight, subdivision three, of this chapter. Nothing in this section contained shall be construed so as to permit any room without a window opening on the street or yard or on a court in every part of the dimensions prescribed in the foregoing sections. When a court starts at the level of the second tier of beams in whole or in part, and the bottom of said court is a skylight over a store or hall, proper access to the top of said skylight shall be provided, and said skylight shall be so arranged as to be easily cleaned.

### Rear Tenements.

Sec. 60. No separate tenement shall hereafter be erected upon the rear of a lot fifty feet or less in width where there is a tenement house on the front of the said lot, nor upon the front of any such lot upon the rear of which there is such a tenement house.

### Buildings on Same Lot with Tenement Houses.

Sec. 61. If any building is hereafter placed on the same lot with a tenement house there shall always be maintained between the said buildings an open unoccupied space extending upwards from the ground and extending across the entire width of the lot; where either building is sixty feet in height such open space shall be twenty-four feet from wall to wall; and for every twelve feet of increase or fraction thereof in the height of such building, such open space shall be increased one foot in depth throughout its entire width, and for every twelve feet of decrease in the height of such building below sixty feet, the depth of such open space may be decreased one foot. And no building of any kind shall be hereafter placed upon the same lot with a tenement house so as to decrease the minimum size of courts or yards as hereinbefore prescribed. And if any tenement house is hereafter erected upon any lot upon which there is already another building, it shall comply with all of the provisions of this chapter, and in addition the space between the said building and the said tenement house shall be of such size and arranged in such manner as is prescribed in this section, the height of the highest building on the lot to regulate the dimensions.

### Rooms, Lighting and Ventilation of.

Sec. 62. In every tenement house hereafter erected every room, except water closet compartments and bathrooms, shall have at least one window opening directly upon the street or upon a yard or court of the dimensions specified in sections fifty-two to sixty of this chapter, and such window shall be so located as to properly light all portions of such rooms. In addition to the above requirement, in tenement houses hereafter erected no apartment of three rooms or less shall extend in depth from the street or yard, as the case may be, for a greater distance than eighteen feet without the intervention of an inner or outer court adjoining said room, constructed as required by

this chapter. Wherever a room in a tenement house hereafter erected opens upon an inner court less than ten feet wide, measured from the lot line to the opposite wall of the building, such room shall be provided with a sash window, communicating with another room in the same apartment, such window to contain not less than ten square feet of glazed surface, and to be made so as to readily open. No tenement house shall be so altered that any room or public hall shall have its light or ventilation diminished in any way not approved by the department charged with the enforcement of this article.

### Windows in Rooms.

Sec. 63. In every tenement house hereafter erected the total window area in each room, except water closet compartments and bathrooms, shall be at least one-tenth of the superficial area of the room, and the top of at least one window shall not be less than seven feet six inches above the floor, and the upper half of it shall be made so as to open the full width. No such window shall be less than twelve square feet in area between the stop beads.

### Rooms, Size of.

Sec. 64. In every tenement house hereafter erected all rooms, except water closet compartments and bathrooms, shall be of the following minimum sizes: In each apartment there shall be at least one room containing not less than one hundred and twenty square feet of floor area, and each other room shall contain at least seventy square feet of floor area. Each room shall be in every part not less than nine feet high from the finished floor to the finished ceiling; provided that an attic room need be nine feet high in but one-half of its area.

### Alcoves and Alcove Rooms.

Sec. 65. An alcove in any room in a tenement house here-

after erected shall be separately lighted and ventilated as provided in sections sixty-two and sixty-three, and shall be not less than seventy square feet in area. No part of any room in a tenement house hereafter erected shall be enclosed or subdivided at any time, wholly or in part, by a curtain, portiere, fixed or movable partition or other contrivance or device, unless such part of the room so enclosed or subdivided shall contain a window as required by sections sixty-two and sixty-three of this chapter, and a floor area of not less than seventy square feet.

### Public Halls.

Sec. 66. In every tenement house hereafter erected, which is occupied or arranged to be occupied by more than two families on any floor, or which exceeds four stories and cellar in height, shall have at least one window opening directly upon the street or upon a yard or court. Either such window shall be at the end of said hall, with the plane of the window at right angles to the axis of said hall, or there shall be at least one window opening directly upon the street or upon a yard or court in every twenty feet in length or fraction thereof of said hall; but this provision for one window in every twenty feet of hallway shall not apply to that portion of the entrance hall between the entrance and the first flight of stairs, provided that the entrance door contains not less than five square feet of glazed surface. In every public hall in such tenement house recesses or returns the length of which does not exceed twice their width will be permitted without an additional window. But wherever the length of such recess or return exceeds twice its width the above provisions in reference to one window in every twenty feet of hallway shall be applied. Any part of a hall which is shut off from any other part of said hall by a door or doors shall be deemed a separate hall within the meaning of this section. In every tenement house hereafter erected where the public hall is not provided with a window opening directly to the outer air as above provided, there shall be a stair well not less than twelve inches wide ex-

tending from the entrance floor to the roof, and all doors leading from such public halls shall be provided with translucent glass panels of an area of not less than five square feet for each door, and also with fixed transoms of translucent glass over each door.

### Windows and Skylights for Public Halls, Size of.

Sec. 67. In every tenement house hereafter erected one at least of the windows provided to light each public hall or part thereof shall be at least two feet six inches wide and five feet high, measured between stop beads. In every such house there shall be in the roof, directly over each stair-well, a ventilating skylight provided with ridge ventilators having a minimum opening of forty square inches, or such skylight shall be provided with fixed or movable louvres; the glazed roof of such skylight shall be not less than twenty square feet in area. In tenement houses hereafter erected where the stairs and public halls are not provided with windows on each floor opening directly to the outer air, the skylights shall be provided with both such ridge ventilators, and also with fixed or movable louvres or movable sashes.

### Windows for Stair Halls, Size of.

Sec. 68. In every tenement house hereafter erected the aggregate area of windows to light or ventilate stair halls shall be at least eighteen square feet for each floor. There shall be provided for each story at least one of said windows, which shall be at least two and a half feet wide and five feet high, measured between the stop beads. A sash door shall be deemed the equivalent of a window in this section and sections sixty-six and sixty-seven of this chapter, provided that such door contains the amount of glazed surface prescribed for such windows.

### Privacy.

Sec. 69. In every apartment of three or more rooms in a

tenement house hereafter erected, access to every living room and bedroom and to at least one water closet compartment shall be had without passing through any bedroom.

### Percentage of Lot Occupied.

Sec. 70. No tenement house shall hereafter be enlarged, or its lot be diminished, so that a greater percentage of the lot shall be occupied by buildings or structures than provided in section fifty of this chapter, the measurements may be taken at the level of the second tier of beams; provided that the space occupied by fire escapes of the size hereinbefore prescribed, and by chimneys or flues located in yards and attached to the houses which do not exceed five square feet in area and do not obstruct light or ventilation, shall not be deemed a part of the lot occupied.

### Yards.

Sec. 71. No tenement house shall hereafter be enlarged or its lot be diminished, so that the yard shall be less in depth than the minimum depths prescribed by sections fifty-two, fifty-three, fifty-four and fifty-five of this chapter for tenement houses hereafter erected. The measurements in all cases shall be taken from the extreme rear wall of the building to the rear lot line, and across the full width of the lot, and such yard shall be at every point open from the ground to the sky, except as provided in sections fifty-two and seventy of this chapter.

### Additional Rooms and Halls.

Sec. 72. Any additional room or hall that is hereafter constructed or created in a tenement house shall comply in all respects with the provisions of this article, except that such rooms may be of the same height as the other rooms on the same story of the house.

ROOMS, LIGHTING AND VENTILATION OF.

Sec. 73. No room in a tenement house existing on April eleventh, nineteen hundred and one, shall be occupied for living purposes unless it shall have a window opening directly upon the street, or upon a yard not less than four feet deep, or above the roof of an adjoining building, or upon a court or shaft of not less than twenty square feet in area, open to the sky without roof or skylight, unless such room is located on the top floor and is adequately lighted and ventilated by a skylight opening directly to the outer air. Every room which does not comply with the above provisions shall be provided with a sash window, opening into an adjoining room in the same apartment, which latter room either opens directly on the street or on a yard of the above dimensions, or itself connects by a similar sash window or series of windows with such an outer room. Said sash windows shall be a vertically-sliding pulley-hung sash not less than three feet by five feet between stop beads, both halves shall be made so as to readily open, and the lower half shall be glazed with translucent glass, and so far as possible it shall be in line with windows in outer rooms opening on the street or yard so as to afford a maximum of light and ventilation. Where it is not possible to construct a window of this width, then such window may be of such size as may be prescribed by the department charged with the enforcement of this chapter. An alcove opening of no less dimensions than said sash window, in addition to the usual door opening, shall be deemed its equivalent. In the case of rooms located in apartments that extend through from the street to the yard, thus ensuring through ventilation, where such rooms are already provided either with windows, window openings, glass sliding doors, or large alcove openings to adjoining rooms but do not comply with all the provisions of this section, the department charged with the enforcement of this chapter when satisfied that no material improvement in the light and ventilation of such rooms can be had that would warrant the providing of new windows of the size and kind specified, may permit the occupancy

of such rooms for living purposes in the following cases, provided such improvements or alterations as may be practicable and as are required by said department are made by the owner:

(1.) Where there is an existing window or window opening from such interior room to an adjoining room and such window or opening is not less than ten square feet in area.

(2.) Where there is an existing glass sliding door or an alcove opening of sufficient size from such interior room to an adjoining room.

(3.) Where rooms located on the top floor open upon an air shaft of less size than twenty square feet or closed at the top, but such rooms have sufficient light and ventilation.

(4.) Where owing to the size of partitions, arrangement of rooms, location of fixed closets or stairs, or the interposition of air shafts, it is impracticable to provide a window of the required size and a window as large as practicable is provided.

In all tenement houses, wherever erected, the department charged with the enforcement of this chapter may require the walls and ceilings of every room that does not open directly on the street to be kalsomined white or painted with white paint when necessary to improve the lighting of such room and may require this to be renewed as often as may be necessary.

### Public Halls, Lighting of.

Sec. 74. In every tenement house four stories or over in height, whenever a public hall on any floor is not light enough in the daytime to permit a person to read in every part thereof without the aid of artificial light, the wooden panels in the doors located at the end of the public halls and opening into rooms shall be removed, and ground glass, or other translucent glass or wire glass panels of an aggregate area of not less than four square feet for each door shall be substituted; or in lieu of removing the panels in the doors a fixed sash window of wire glass of an area of not less than five square feet may be cut into the partitions separating the said hall from a room which

opens directly upon the street or upon a yard, court, or shaft of the dimensions specified in the last section; or said public hall may be lighted by a window or windows at the end thereof with the plane of the window at right angles to the axis of the said hall, said window opening upon the street or upon a yard, court or shaft of said dimensions. In every such house where the public halls and stairs are not provided with windows opening directly to the street or yard, and such halls and stairs are, in the opinion of the department charged with the enforcement of this chapter, not sufficiently lighted, the owner of such house shall keep a proper light burning in the hallway, near the stairs, upon each floor, as may be necessary, from sunrise to sunset.

### Light and Vent Shafts in Existing Buildings.

Sec. 75. Any shaft used or intended to be used to light or ventilate rooms used or intended to be used for living purposes, and which may be hereafter placed in a tenement house erected prior to April tenth, nineteen hundred and one, shall not be less in area than twenty-five square feet, nor less than four feet in width in any part, and such shaft shall under no circumstances be roofed or covered over at the top with a roof or skylight; every such shaft shall be provided at the bottom with a horizontal intake or duct, of a size not less than four square feet, and communicating directly with the street or yard, and such duct shall be so arranged as to be easily cleaned out.

### Public Halls.

Sec. 76. In every tenement house a proper light shall be kept burning by the owner in the public hallways, near the stairs, upon the entrance floor, and upon the second floor, above the entrance floor of said house, every night from sunset to sunrise throughout the year, and upon all other floors of the said house from sunset until ten o'clock in the evening.

### Skylights and Ventilators.

Sec. 77. In all tenement houses erected prior to April tenth, nineteen hundred and one, the public halls and stairs shall be provided with such skylights, ventilators, windows in bulkheads or other means of light and ventilation as may be deemed practicable by the department charged with the enforcement of this chapter. All new skylights hereafter placed in such houses shall be provided with ridge ventilators having a minimum opening of forty square inches and also with either fixed or movable louvres or with movable sashes and shall be of such size as may be determined to be practicable by said department.

### Chimneys and Fireplaces.

Sec. 78. In every tenement house there shall be adequate chimneys running through every floor with an open fireplace or grate, or place for a stove, properly connected with one of said chimneys for every apartment.

### Vent Shafts.

Sec. 79. Every vent shaft hereafter constructed in a tenement house shall be at least twenty square feet in area, and the least dimension of such shaft shall not be less than four feet; and if the building be above sixty feet in height such shaft shall throughout its entire height be increased in area three square feet for each additional twelve feet of height or fraction thereof; and for each twelve feet of height less than sixty feet such shaft may be decreased in area three square feet. A vent shaft may be inclosed on all four sides but shall not be roofed or covered over in any way. Every such shaft shall be provided with a horizontal intake or duct at the bottom, communicating with the street or yard or with a court; such duct or intake to be not less than four square feet in total area, and to be so arranged as to be easily cleaned out.

## ARTICLE V.

### Sanitary Provisions.

Section 90. Basements and cellars.
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93. Water closet accommodations
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95. Basements and cellars.
96. Janitor's arpartments in cellars.
97. Water closets.
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111. Overcrowding.

### Basements and Cellars.

Sec. 90. (1) In tenement houses hereafter erected no room in the cellar or in the basement shall be constructed, altered, converted or occupied for living purposes, unless all of the following conditions are complied with:

a. Such room shall be at least nine feet high in every part from the floor to the ceiling. Provided, that in buildings already erected and not now used as tenement houses but hereafter

altered or converted to such use, such room shall be not less than seven feet high in every part.

b. The ceiling of such rooms shall be in every part at least four feet and six inches above the curb level of the street in front of every part of such room, when such room of the apartment containing it is located in the front part of the building; when, however, such room or the apartment containing it is located in the rear of the building, the ceiling thereof shall be not less than two feet above the curb level of the street in front of the building, and the yard and courts upon which such room or apartment opens shall extend to a point below the floor level of said room, as prescribed in section ninety-one of this chapter. Every such room shall be an integral part of an apartment containing a room having a window opening directly to the street or yard. There shall be not more than one apartment in any cellar and this shall contain not more than five rooms and bath, and shall be occupied solely by the janitor and his family, and no other rooms in the cellar shall be occupied for living or sleeping purposes. No part of such apartment shall be located more than twenty-five feet distant from the inner line of the front or rear wall of the building, as the case may be.

c. There shall be appurtenant to such room the use of a separate water closet, constructed and arranged as required by section ninety-three of this chapter.

d. Such room shall have a window or windows opening upon the street, or upon a yard or court. The total area of windows in such room shall be at least one-eighth of the superficial area of the room, and the upper half of the window shall be made to open the full width, by means of a vertically sliding pulley-hung sash, and the under side of the top stop bead of each window shall be within twelve inches of the ceiling. No such windows shall be less than twelve square feet in area between the stop beads.

e. All walls surrounding such rooms shall be damp-proof.

f. The floor of such room shall be damp-proof and waterproof.

(2) Every tenement house hereafter erected shall have all walls below the ground level and all cellar or lower floors damp-proof and water-proof. When necessary to make such walls and floors damp-proof and water-proof, the damp-proofing and water-proofing shall run through the walls and up the same as high as the ground level and shall be continued throughout the floor, and the said cellar or lowest floor shall be properly constructed so as to prevent dampness or water from entering. All cellars and basements in such tenement houses shall be properly lighted and ventilated to the satisfaction of the department charged with the enforcement of this chapter.

### Shafts, Courts, Areas and Yards.

Sec. 91. In every tenement house hereafter erected the bottom of all shafts, courts, areas and yards which extend to the basement for light or ventilation of living rooms must be six inches below the floor level of the part occupied or intended to be occupied. In every tenement house all shafts, courts, areas and yards shall be properly graded and drained, and connected with the street sewer so that all water may pass freely into it. And when required by the department charged with the enforcement of this chapter they shall be properly concreted.

### Water Supply.

Sec. 92. In every tenement house hereafter erected there shall be in each apartment a proper sink with running water.

### Water Closet Accommodations.

Sec. 93. In every tenement house hereafter erected there shall be a separate water closet in a separate, compartment within each apartment, provided that where there are apartments consisting of but one or two rooms, there shall be at

least one water closet for every three rooms. Every water closet and bath hereafter placed in any tenement house shall be placed in a compartment completely separated from every other water closet and bath; such compartment shall be not less than two feet and four inches wide, and shall be inclosed with plastered partitions, which shall extend to the ceiling. In tenement houses erected after April tenth, nineteen hundred and one, such compartments shall have a window opening directly upon the street or yard, or upon a court or vent shaft. In tenement houses erected prior to April tenth, nineteen hundred and one, such compartment shall have a window opening directly upon the street, or upon a yard not less than four feet deep, or upon a court or shaft of not less than twenty-five square feet in area, open to the sky without roof or skylight. Every such window shall be at least one foot by three feet between stop beads, and the entire window shall be made so as to readily open. When, however, such water closet compartment is located on the top floor and is lighted and ventilated by a skylight over it, or is located at the bottom of a shaft or court of lawful size, and is lighted and ventilated by a skylight over it at the bottom of such shaft or court, no window shall be necessary, provided the roof of such skylight contains at least three square feet of glazed surface and is arranged so as to readily open. Nothing in this section in regard to the separation of water closet compartments from each other shall apply to a general toilet room containing several water closets hereafter placed in a tenement house provided such water closets are supplemental to the water closet accommodations required by law for the use of the tenants of the said house. Nothing in this section in regard to the ventilation of water closet compartments shall apply to a water closet hereafter placed in a tenement house, where it is provided to replace a defective fixture in the same position and location. No water closet shall be maintained in the cellar of any tenement house without a special permit in writing from the department charged with the enforcement of this chapter, which shall have power to make rules and regulations govern-

ing the maintenance of such closets. Every water closet compartment hereafter placed in any tenement house shall be provided with proper means of lighting the same at night. If fixtures for gas or electricity are not provided in said compartment, then the door of said compartment shall be provided with translucent glass panels, or with a translucent glass transom, not less in area than four square feet. The floor of every such water closet compartment shall be made waterproof with asphalt, tile, stone or some other waterproof material; and such water-proofing shall extend at least six inches above the floor so that the said floor can be washed or flushed out without leaking. No drip trays shall be permitted. No water closet fixtures shall be inclosed with any woodwork.

### PLUMBING.

Sec. 94. In every tenement house hereafter erected all plumbing pipes shall be exposed, when so required by the department charged with the enforcement of this chapter. In all tenement houses hereafter erected where plumbing or other pipes pass through floors or partitions, the openings around such pipes shall be sealed or made air-tight with plaster or other incombustible materials so as to prevent the passage of air or the spread of fire from one floor to another or from room to room.

### BASEMENT AND CELLAR ROOMS.

Sec. 95. Hereafter in any tenement house no room in the basement or cellar shall be occupied for living purposes without a written permit from the department charged with the enforcement of this chapter and such permit shall be kept readily accessible in the main living room of the apartment containing such room. And no such room in a tenement house erected prior to April tenth, nineteen hundred and one, shall hereafter be occupied unless all the following conditions are complied with. The

said written permit shall be issued when all of said conditions are complied with. If refused, the reason for such refusal shall be stated by said department in writing, and a copy thereof shall be kept in a proper book in the office of said department, and be accessible to the public.

(1) Such room shall be at least seven feet high in every part from the floor to the ceiling.

(2) The ceiling of such room shall be in every part at least two feet above the surface of the street or ground outside of or adjoining the same.

(3) There shall be appurtenant to such room the use of a water closet.

(4) There shall be outside of and adjoining such room, and extending along the entire frontage of at least one of the rooms of the apartment, an open space of at least two feet six inches wide in every part, unless such room extends for more than one-half of its height above the curb level. Such space shall be well and effectually drained.

(5) At least one of the rooms of the apartment of which such room is an integral part, shall have a window or windows opening directly to the street or yard, of at least twelve square feet in size clear of the sash frame, and which shall have been made to readily open for the purposes of ventilation.

(6) If the house is situated over marshy ground, or ground upon which water lies, or ground on which there is water pressure from below, the lowest floor shall have been made waterproof and dampproof.

(7) Such room shall have sufficient light and ventilation, shall be well drained and dry, and shall be fit for human habitation.

In the case of rooms located in tenement houses erected prior to April tenth nineteen hundred and one, which do not comply with all the provisions of subdivision one, two and four of this section, the department charged with the enforcement of this chapter may issue a special permit for occupancy provided said department shall certify in writing that such rooms have

sufficient light and ventilation, are well drained and dry, and are fit for human habitation. The procedure in such cases shall be as follows: Upon receipt of a written request from the owner stating that there are rooms in the basement or cellar which are or have been previously occupied for living purposes, but which do not conform to the requirements of subdivisions one, two and four of this section, and requesting a special permit for the occupancy of such rooms, the department charged with the enforcement of this chapter shall cause an inspection to be made, and a written report filed which shall state the respects in which said rooms do not conform to the requirements of said subdivisions and whether said rooms have sufficient light and ventilation, are well drained and dry and fit for human habitation. No such special permit, however, shall be issued unless such facts are certified to in writing separately by at least two inspectors of said department. Such special permits shall be issued only by the head of the department or his deputies, who may require such improvements or alterations in said rooms as may be practicable as a condition precedent to the granting of said special permit. All reports and papers connected therewith shall be deemed public records.

### Janitor's Apartments in Cellar.

Sec. 96. In a tenement house erected prior to April tenth, nineteen hundred and one, where there is an apartment in the cellar now occupied by the janitor and his family, and the rooms of said apartment do not conform to all the provisions of section ninety-five of this chapter, upon written certification by the department charged with the enforcement of this chapter, of the number of said rooms and of the fact that said department has received from the owner of said tenement house satisfactory evidence of the existence of said apartment and its use for said purpose prior to April tenth, nineteen hundred and one, and upon the filing in said deparment by the owner of said house of a written instrument declaring his intention to permanently aban-

don the use of said rooms for such purpose, and upon their complete abandonment by said owner and the removal of the partitions forming them and of all plumbing and fixtures therein or used in connection therewith, the said department may issue a written permit to the owner of said tenement house, permitting the construction of a new apartment in said cellar under the following conditions:

Exc (1) Its use shall be limited solely to the janitor and his family.

(2) It shall not contain a greater number of rooms than the apartment aforementioned nor in any case more than four rooms and bath.

(3) It shall conform to all the provisions of subdivisions one, three, six and seven of section ninety-five of this chapter.

(4) At least one room in said apartment shall have a window opening directly upon a yard not less than ten feet deep in every part, and every portion of said yard shall extend down below the floor of such room and said yard shall be well and effectually drained.

(5) Every other room in said apartment shall have a window opening directly upon such a yard or upon a court or shaft open to the sky without roof or skylight, and not less than twenty-five square feet in area nor less than four feet in its least horizontal dimension measured from wall to wall. Every portion of such court or shaft shall extend down below the floor of such room, and shall be well and effectually drained. If inclosed on four sides, such court or shaft shall be provided with a horizontal intake constructed as is required for inner courts in subdivision three of section fifty-eight of this chapter.

(6) Every portion of each room in said apartment shall be entirely above the level of the adjoining yard, court or shaft.

WATER CLOSETS.

Sec. 97. In all tenement houses existing on April eleventh, nineteen hundred and one, the woodwork inclosing all water

closets shall be removed from the front of said closets, and the space underneath the seat shall be left open. The floor or other surface around and beneath the closet shall be maintained in good order and repair and if of wood shall be kept well painted with light colored paint.

### Public Sinks.

Sec. 98. In all tenement houses existing on April eleventh, nineteen hundred and one, the woodwork inclosing sinks located in the public halls or stairs shall be removed, and the space underneath said sinks shall be left open. The floors and wall surfaces beneath and around the sink shall be maintained in good order and repair, and if of wood shall be kept well painted with light colored paint.

### Privy Vaults, School Sinks and Water Closets.

Sec. 99. In all tenement houses existing on April eleventh, nineteen hundred and one, where a connection with a sewer is possible, all school sinks, privy vaults or other similar receptacles used to receive fecal matter, urine or sewage, shall before January first, nineteen hundred and three, be completely removed and the place where they were located properly disinfected under the direction of the department charged with the enforcement of this chapter. Such appliances shall be replaced by individual water closets of durable non-absorbent material, properly sewer connected, and with individual traps and properly connected flush tanks providing an ample flush of water to thoroughly cleanse the bowl. Each water closet shall be located in a compartment completely separated from every other water closet, and such compartment shall contain a window of not less than three square feet in area opening directly to the outer air. The floors of the water closet compartments shall be waterproof as provided in section ninety-three of this chapter. Where water closets are placed in the yard to replace school sinks or privy vaults long hopper closets may be used; but all traps, flush tanks

and pipes shall be protected against the action of frost. In such cases, the structure containing the water closets shall not exceed ten feet in height; and shall not be considered as increasing the percentage of the lot occupied; nor shall it be subject to the provisions of section sixty-one of this chapter, provided that it does not occupy more than fifty per centum of the open space or yard in which it is placed, and provided further that the use of said structure is limited solely to water closet purposes. Such structure shall be provided with a ventilating skylight in the roof, of an adequate size, and each water closet shall be located in an apartment completely separated from every other water closet. Proper and adequate means for lighting the structure at night shall be provided. There shall be provided at least one water closet for every two families in every tenement house existing on April eleventh, nineteen hundred and one. Except as in this section otherwise provided such water closets and all plumbing in connection therewith shall be in accordance with the ordinances and regulations in relation to plumbing and drainage.

### Basement and Cellars.

Sec. 100. The floor of the cellar or lowest floor of every tenement house shall be free from dampness and, when necessary, shall be concreted with four inches of concrete of good quality and with a finished surface. The cellar ceiling of every tenement house shall be plastered, when so required by the department charged with the enforcement of this chapter, except where such ceiling is already well sheathed with matched boards or well covered with a metal ceiling or where the first floor above the cellar is constructed of iron beams and fireproof filling.

Section 7. Section one hundred and twenty-one of said chapter is hereby amended to read as follows:

### Cellar Walls and Ceilings.

Sec. 101. The cellar walls and ceilings of every tenement

house shall be thoroughly whitewashed or painted a light color by the owner and shall be so maintained. Such whitewash or paint shall be renewed whenever necessary, as may be required by the department charged with the enforcement of this chapter.

### Repairs

Sec. 102. Every tenement house and all the parts thereof shall be kept in good repair, and the roof shall be kept so as not to leak, and all rain water shall be so drained and conveyed therefrom as to prevent its dripping on to the ground or causing dampness in the walls, ceilings, yard or areas.

### Water Supply.

Sec. 103. Every tenement house shall have water furnished in sufficient quantity at one or more places on each floor occupied or intended to be occupied by one or more families. The owner shall provide proper and suitable tanks, pumps or other appliances to receive and to distribute an adequate and sufficient supply of such water at each floor in the said house, at all times of the year, during all hours of the day and night. But a failure in the general supply of water by the city authorities shall not be construed to be a failure on the part of such owner, provided that proper and suitable appliances to receive and distribute such water have been provided in said house.

### Cleanliness of Buildings.

Sec. 104. Every tenement house and every part thereof shall be kept clean and free from any accumulation of dirt, filth or garbage or other matter in or on the same, or in the yards, courts, passages, areas or alleys connected with or belonging to the same. The owner of every tenement house or part thereof shall thoroughly cleanse all the rooms, passages, stairs, floors, win-

dows, doors, walls, ceilings, privies, water closets, cesspools, drains, halls, cellars, roofs, and all other parts of the said tenement house, or part of the house of which he is the owner, to the satisfaction of the department of health, and shall keep the said parts of the said tenement house in a cleanly condition at all times. No person shall place filth, urine or fecal matter in any place in a tenement house other than that provided for the same, or keep filth, urine or fecal matter in his apartment or upon his premises such length of time as to create a nuisance.

### Shafts and Courts.

Sec. 105. In every tenement house there shall be, at the bottom of every shaft and inner court, a door giving sufficient access to such shaft or court to enable it to be properly cleaned out. In shafts or courts of a less size than prescribed in section fifty-eight, subdivisions one and two, of this chapter, such door shall be fireproof and self-closing. Provided, that where there is already a window or door in a tenement house giving proper access to such shaft or court, such window or door shall be deemed sufficient.

### Walls of Courts and Shafts.

Sec. 106. The walls of all yard courts, inner courts and shafts unless built of a light color brick or stone shall be thoroughly whitewashed by the owner or shall be painted a light color by him, and shall be so maintained. Such whitewash or paint shall be renewed whenever necessary, as may be required by the department charged with the enforcement of this chapter.

### Wall Paper.

Sec. 107. No wall paper shall be placed upon a wall or ceiling of any tenement house unless all wall paper shall be first removed therefrom and said wall and ceiling thoroughly cleaned.

### Receptacles for Ashes, Garbage and Refuse.

Sec. 108. The owner of every tenement house shall provide for said building proper and suitable conveniences or receptacles for ashes, rubbish, garbage, refuse and other matter.

### Prohibited Uses.

Sec. 109. No horse, cow, calf, swine, sheep or goat shall be kept in a tenement house, or on the same lot or premises thereof, and no tenement house, or the lot or premises thereof, shall be used for a lodging house or stable, or for the storage or handling of rags. Except that, outside of the fire limits, not more than two horses may be kept on such lot or premises, provided they are stabled at least twenty feet distant from any building used for living purposes, and that such stabling is not detrimental to health in the opinion of the department charged with the enforcement of this chapter.

### Janitor or Housekeeper.

Sec. 110. Whenever there shall be more than eight families living in any tenement house, in which the owner thereof does not reside, there shall be a janitor, housekeeper or some other responsible person who shall reside in said house and have charge of the same, if the department charged with the enforcement of this chapter shall so require.

### Overcrowding.

Sec. 111. No room in any tenement house shall be so overcrowded that there shall be afforded less than four hundred cubic feet of air to each adult, and two hundred cubic feet of air to each child under twelve years of age occupying such room.

## ARTICLE VI.

### Requirements and Remedies.

Section 120. Permit to commence building.
121. Certificate of compliance.
122. Unlawful occupation.
123. Enforcement.
124. Penalties for violations.
125. Violation of building laws, ordinances and regulations.
126. Procedure.
127. Liens.
128. Lis pendens.

### Permit to Commence Building.

Sec. 120. Before the construction or alteration of a tenement house, or the alteration or conversion of a building for use as a tenement house, is commenced, and before the construction or alteration of any building or structure on the same lot with a tenement house, the owner, or his agent, or architect, shall submit to the department charged with the enforcement of this chapter a detailed statement in writing, verified by the affidavit of the person making the same, of the specifications for the construction and for the light and ventilation of such tenement house or building, upon a blank or form to be furnished by such department, and also a full and complete copy of the plans of such work. Such statements shall give in full the name and residence, by street and number, of the owner or owners of such tenement house or building. If such construction, alteration or conversion is proposed to be made by any other person than the owner of the land in fee, such statement shall contain the full name and residence, by street and number, not only of the owner of the land, but of every person interested in such tenement house, either as owner, lessee or in any representative

capacity. Such affidavit shall allege that said specifications and plans are true and contain a correct description of such tenement house, building, structure, lot and proposed work. The statements and affidavits herein provided for may be made by the owner, or the person who proposes to make the construction, alteration or conversion, or by his agent or architect. No person, however, shall be recognized as the agent of the owner, unless he shall file with the said department a written instrument, signed by such owner, designating him as such agent. Any false swearing in a material point in such affidavit shall be deemed perjury. Such specifications, plans and statements shall be filed in the said department and shall be deemed public records, but no such specifications, plans or statements shall be removed from said department. The said department shall cause all such plans and specifications to be examined. If such plans and specifications conform to the provisions of this chapter and to the building ordinances and regulations they shall be approved by such department, and a written certificate to that effect shall be issued to the person submitting the same. The department may, from time to time, approve changes in any plans and specifications perviously approved by it, provided the plans and specifications when so changed shall be in conformity with law. The construction, alteration or conversion of such tenement house, building or structure or any part thereof, shall not be commenced until the filing of such specifications, plans and statements, and the approval thereof, as above provided. The construction, alteration or conversion of such house, building or structure shall be in accordance with such approved specifications and plans. Any permit or approval which may be issued by the department charged with the enforcement of this chapter, but under which no work has been done above the foundation walls within one year from the time of the issuance of such permit or approval, shall expire by limitation. Said department shall have power to revoke or cancel any permit or approval in case of any failure or neglect to comply with any of the provisions of this chapter, or in case any false statement or representation is made in any

specifications, plans or statements submitted or filed for such permit or approval.

### Certificate of Compliance.

Sec. 121. No building hereafter constructed as or altered into a tenement house shall be occupied in whole or in part for human habitation until the issuance of a certificate by the department aforesaid that said building conforms in all respects to the requirements of this chapter. Such certificate shall be issued within ten days after written application therefor, if said building at the date of such application shall be entitled thereto. Such a certificate, on the record in the department aforesaid that such a certificate has been issued, or a statement signed by the head of such department that such a certificate has been issued, may be relied upon by every person who in good faith purchases a tenement house or who in good faith lends money upon the security of mortgage covering a tenement house. Whenever any such person has so relied upon such certificate, no claim that such tenement house does not conform in all respects to the provisions of this chapter shall be made against such person or against the interest of such person in a tenement house to which such a certificate applies or concerning which such a statement has been issued.

### Unlawful Occupation.

Sec. 122. If any building hereafter constructed as or altered into a tenement house be occupied in whole or in part for human habitation in violation of the last section, during such unlawful occupation any bond or note secured by a mortgage upon said building, or the lot upon which it stands, may be declared due at the option of the mortgagee. No rent shall be recoverable by the owner or lessee of such premises for such period, and no action or special proceeding shall be maintained therefor, or for possession of said premises for non-payment of rent. The de-

partment of water supply shall not permit water to be furnished in any such tenement house, and said premises shall be deemed unfit for human habitation, and the department of health shall cause them to be vacated accordingly. Provided, however, that any tenement house erected after April tenth, nineteen hundred and one, and which has been occupied for human habitation for two years immediately preceding the first day of January, nineteen hundred and nine, in which no changes or alterations have been made except in compliance with this chapter, shall be permitted to be occupied in the same manner as if a certificate had been issued that such tenement house conforms in all respects to the requirements of this chapter, unless an action or proceeding to require it to be vacated shall have been brought within six months after the passage of this act.

Section 9. This act shall take effect immediately.

### Enforcement.

Sec. 123. (1) Except as herein otherwise provided, the provisions of this chapter shall be enforced by the department of any city to which this chapter applies, which is now charged with the enforcement of laws, ordinances and regulations relating to similar subject matter in tenement houses.

(2) Nothing in this chapter shall be construed to abrogate or impair the powers of the department of health, the department of buildings, or of the courts, to enforce any of the provisions of the charter or building ordinances and regulations, not inconsistent with this chapter, or to punish violations thereof.

### Penalties for Violations.

Sec. 124. Every person who shall violate or assist in the violation of any provision of this chapter shall be guilty of a misdemeanor punishable by imprisonment for ten days for each and every day that such violation shall continue, or by a fine of not less than ten dollars nor more than one hundred dollars

if the offense be not wilful, or of two hundred and fifty dollars if the offense be wilful, and in every case of ten dollars for each day after the first that such violation shall continue, or by both such fine and imprisonment in the discretion of the court; provided, that the punishment for a violation of section one hundred and forty of this chapter shall be a fine of fifty dollars; and provided further, that the penalty for incumbrance of a fire escape by an occupant of the tenement house shall be a fine of ten dollars, which the nearest police magistrate shall have jurisdiction to impose. The owner of any tenement house or part thereof, or of any building or structure upon the same lot with a tenement house, or of the said lot, where any violation of this chapter or a nuisance exists, and any person who shall violate or assist in violating any provision of this chapter, or any notice or order of the department charged with its enforcement, shall also jointly and severally for each such violation and each such nuisance be subject to a civil penalty of fifty dollars. Such persons shall also be liable for all costs, expenses and disbursements paid or incurred by said department, by any of the officers thereof or by any agent, employee or contractor of the same, in the removal of any such nuisance or violation. Any person who having been served with a notice or order to remove any such nuisance or violation, shall fail to comply with said notice or order within five days after such service, or shall continue to violate any provision or requirement of this chapter in the respect named in said notice or order, shall also be subject to a civil penalty of two hundred and fifty dollars. For the recovery of any such penalties, costs, expenses or disbursements, an action may be brought in any court of civil jurisdiction in said cities. In case the notice required by section one hundred and forty of this chapter is not filed, or in case the owner, lessee or other person having control of such tenement house does not reside within the state, or cannot after diligent effort be served with process therein, the existence of a nuisance or of any violation of this chapter, or of any violation of an order or a notice made by said department, in said tenement house or on the lot

on which it is situated, shall subject said tenement house and lot to a penalty of two hundred and fifty dollars. Said penalty shall be a lien upon said house and lot.

### Violation of Building Laws, Ordinances and Regulations.

Sec. 125. Any owner, agent, architect, builder, contractor, sub-contractor or foreman who shall, in the construction or alteration of any building intended to be used as a tenement house, knowingly violates any of the provisions of the building laws, ordinances or regulations shall be guilty of a misdemeanor.

### Procedure.

Sec. 126. Except as herein otherwise specified, the procedure for the prevention of violations of this chapter, or for the vacation of premises unlawfully occupied, or other abatement of nuisance in connection with a tenement house, shall be as set forth in charter and ordinances. In case any tenement house, building or structure or any part thereof is constructed, altered, converted or maintained in violation of any provision of this chapter or of any order or notice of the department charged with its enforcement, or in case a nuisance exists in any such tenement house, building or structure or upon the lot on which it is situated, said department may institute any appropriate action or proceeding to prevent such unlawful construction, alteration, conversion or maintenance, to restrain, correct or abate such violation or nuisance, to prevent the occupation of said tenement house, building or structure, or to prevent any illegal act, conduct or business in or about such tenement house or lot. In any such action or proceeding said department may, by affidavit setting forth the facts, apply to the supreme court, or to any justice thereof, for an order granting the relief for which said action or proceeding is brought, or for an order enjoining all persons from doing or permitting to be done any

work in or about such tenement house, building, structure or lot, or from occupying or using the same for any purpose, until the entry of final judgment or order. In case any notice or order issued by said department is not complied with, said department may apply to the supreme court, or to any justice thereof, for an order authorizing said department to execute and carry out the provisions of said notice or order, to remove any violation specified in said notice or order, or to abate any nuisance in or about such tenement house, building or structure, or the lot upon which it is situated. The court, or any justice thereof, is hereby authorized to make any order specified in this section. In no case shall the said department or any officer thereof or the city be liable for costs in any action or proceeding that may be commenced in pursuance of this chapter. In an action to establish a lien under this chapter, the procedure shall be as set forth in sections one hundred and forty-three and one hundred and fifty-five to one hundred and sixty of this chapter. The judgment in any such action may provide for the sale of said property, and for such other remedies to secure the enforcement thereof as the court may deem proper.

LIENS.

Sec. 127. Every fine imposed by judgment under section one hundred and twenty-four of this chapter upon a tenement house owner shall be a lien upon the house in relation to which the fine is imposed from the time of the filing of a certified copy of said judgment in the office of the clerk of the county in which said tenement house is situated, subject only to taxes, assessments and water rates and to such mortgage and mechanics' liens as may exist thereof prior to such filing; and it shall be the duty of the department of health upon the entry of said judgment, to forthwith file the copy as aforesaid, and such copy, upon such filing, shall be forthwith indexed by the clerk in the index of mechanics' liens.

Sec. 128. In any action or proceeding instituted by the

department charged with the enforcement of this chapter, the plaintiff or petitioner may file in the county clerk's office of the county where the property affected by such action or proceeding is situated, a notice of the pendency of such action or proceeding. Said notice may be filed at the time of the commencement of the action or proceeding, or at any time afterwards before final judgment or order, or at any time after the service of any notice or order issued by such department. Such notice shall have the same force and effect as the notice of pendency of action provided for in the code of civil procedure. Each county clerk with whom such notice is filed shall record it, and shall index it to the name of each person specified in a direction subscribed by the corporation counsel. Any such notice may be vacated upon the order of a judge or justice of the court in which such action or proceeding was instituted or is pending, or upon the consent in writing of the corporation counsel. The clerk of the county where such notice is filed is hereby directed to mark such notice and any record or docket thereof as canceled of record, upon the presentation and filing of such consent or of a certified copy of such order.

## *ARTICLE VII.*

### REGISTRY OF NAMES AND SERVICE OF PAPERS.

Section 140. Registry of owner's name.
141. Registry of agent's name.
142. Service of notices and orders.
143. Service of summons.
144. Indexing names.

### REGISTRY OF OWNER'S NAME.

Sec. 140. Every owner of a tenement house and every lessee of the whole house, or other person having control of a tene-

ment house, shall file in the department charged with the enforcement of this chapter, a notice containing his name and address, and also a description of the property, by street number or otherwise, as the case may be, in such manner as will enable the department charged with the enforcement of this chapter easily to find the same; and also the number of apartments in each house, the number of rooms in each apartment, and the number of families occupying the apartments. In case of a transfer of any tenement house, it shall be the duty of the grantor or grantee of said tenement house to file in the department charged with the enforcement of this chapter a notice of such transfer, stating the name of the new owner, within thirty days after such transfer. In case of the devolution of said property by will, it shall be the duty of the executor and the devisee, if more than twenty-one years of age, and in case of the devolution of such property by inheritance without a will, it shall be the duty of the heirs, or in case all of the heirs are under age, it shall be the duty of the guardians of such heirs, and in case such heirs have no guardians, it shall be the duty of the administrator of the deceased owner of said property to file in said department a notice, stating the death of the deceased owner, and the names of those who have succeeded to his interest in said property, within thirty days after the death of the decedent, in case he died intestate, and within thirty days after the probate of his will, if he died testate.

### Registry of Agent's Name.

Sec. 141. Every owner, agent or lessee of a tenement house may file in the department of health a notice containing the name and address of an agent of such house, for the purpose of receiving service of process, and also a description of the property by street number or otherwise, as the case may be, in such manner as will enable the department of health easily to find the same. The name of the owner or lessee may be filed as agent for this purpose.

### Service of Notices and Orders.

Sec. 142. Every notice or order in relation to a tenement house shall be served five days before the time for doing the thing in relation to which it shall have been issued. The posting of a copy of such notice or order in a conspicuous place in the tenement house, together with the mailing of a copy thereof, on the same day that it is posted, to each person, if any, whose name has been filed with the department of health in accordance with the provisions of sections one hundred and forty and one hundred and forty-one of this chapter, at his address as therewith filed, shall be sufficient service thereof.

### Service of Summons.

Sec. 143. In any action brought by any city department in relation to a tenement house for injunction, vacation of the premises or other abatement of nuisance, or to establish a lien thereon, it shall be sufficient service of the summons to serve the same as notices and orders are served under the provisions of the last section; provided, that if the address of any agent whose name and address have been filed in accordance with the provisions of section one hundred and forty-one of this chapter is in the city in which the tenement house is situated, then a copy of the summons shall also be delivered at such address to a person of proper age, if upon reasonable application admittance can be obtained and such person found; and provided also, that personal service of the sumomns upon the owner of such tenement house shall be sufficient service thereof upon him.

### Indexing Names.

Sec. 144. The names and addresses filed in accordance with sections one hundred and forty and one hundred and forty-one shall be indexed under direction of the registrar of records of the department of health, in such a manner that all of those

filed in relation to each tenement house shall be together, and readily ascertainable. The board of health shall provide the registrar with the necessary books and clerical assistance for that purpose, and the expense thereof shall be paid by the city. Said indexes shall be public records, open to public inspection during business hours.

## *ARTICLE VIII.*

### Prostitution in Tenement Houses.

Section 150. Vagrancy.
151. Lien.
152. Permission of lessee.
153. Permission of owner.
154. Rules of evidence.
155. Title of action and parties.
156. Jurisdiction and procedure.
157. Judgment.
158. Sale of property.
159. Receivership.
160. Cancellation of notice of pendency of action.

### Vagrancy.

Sec. 150. A woman who knowingly resides in a house of prostitution of any description in a tenement house or who commits prostitution or indecently exposes her person for the purpose of prostitution in, or who solicits any man or boy to enter a house of prostitution or a room in a tenement house for the purpose of prostitution, shall be deemed a vagrant, and upon conviction thereof shall be committed to the county jail for a term not exceeding six months from the date of commitment. The procedure in such case shall be the same as that provided by law for other cases of vagrancy.

### LIEN.

Sec. 151. A tenement house shall be subject to a penalty of one thousand dollars, if it or any part of it shall be used for the purpose of a house of prostitution or assignation of any description, with the permission of the owner thereof, or his agent, and said penalty shall be a lien upon the house and the lot upon which the house is situated.

### PERMISSION OF LESSEE.

Sec. 152. If a tenement house, or any part thereof, shall be used for the purpose of a house of prostitution or assignation of any description with the permission of the lessee of the whole of said tenement house, or his agent, the lease shall be terminable at the election of the lessor. And the owner shall be entitled to recover possession of said tenement house by summary proceedings in the manner provided by title two of chapter seventeen of the code of civil procedure.

### PERMISSION OF OWNER.

Sec. 153. A tenement house shall be deemed to have been used for the purpose specified in the last two sections with the permission of the owner and lessee thereof, if summary proceedings for the removal of the tenants of said tenement house, or of so much thereof as is unlawfully used, shall not have been commenced within five days after notice of such unlawful use, served by the department of health in the manner prescribed by law for the service of notices and orders, in relation to tenement houses.

### RULES OF EVIDENCE.

Sec. 154. In a prosecution against an owner or agent of a tenement house under section eleven hundred and forty-six of

the penal law, or in an action to establish a lien under section one hundred and fifty-one of this chapter, the general reputation of the premises in the neighborhood shall be competent evidence, but shall not be sufficient to support a judgment without corroborative evidence, and it shall be presumed that their use was with the permission of the owner and lessee; provided, that such presumption may be rebutted by evidence.

### Title of Action and Parties.

Sec. 155. Said action shall be brought against the tenement house as defendant. Said house may be described in the title of the action by its street number, or in any other method sufficiently precise to secure identification. The property shall be described in the complaint. The plaintiff, except as hereinafter provided, shall be the department of health. In case any taxpayer of any city to which this chapter applies, shall request such department in writing to institute an action against any tenement house specified in such request, and such department shall not institute such action within ten days after receiving such request, then any taxpayer of said city may institute and maintain such action against any tenement house in his own name, and in such case the court may in its discretion require security for costs.

### Jurisdiction and Procedure.

Sec. 156. Said action shall be brought in the supreme court in the county in which the property is situated. At or before the commencement of the action the complaint shall be filed in the office of the clerk of the county, together with a notice of the pendency of such action, containing the names of the parties, the object of the action and a brief description of the property affected thereby. Said notice shall be immediately recorded by the clerk in accordance with the provisions of section sixteen hundred and seventy-two of the code of criminal procedure.

The owner or lessee of said building, or both, may appear in said action and answer or demur to the complaint, and the subsequent proceedings in the action shall be the same as in other actions brought to establish a lien or incumbrance upon real property, and the action shall be entitled to a preference in the trial or hearing thereof.

### JUDGMENT.

Sec. 157. The judgment in such action, if in favor of the plaintiff, shall establish the penalty sued for as a lien upon said premises, subject only to taxes, assessments and water rates, and to such mortgage and mechanics' lien as may exist thereon prior to the filing of the notice of pendency of the action.

### SALE OF PROPERTY.

Sec. 158. At any time after the entry of any judgment establishing a lien upon tenement property the department of health, if there be no stay pending appeal, may apply to the court for leave to sell such property. Upon such application the court, if it deem advisable, may order such property to be sold at public auction, subject to taxes, assessments and water rates and to such mortgage and mechanics' liens as aforesaid. The deed to the purchaser shall be made by the department of health. The justices of the appellate division of the supreme court of any judicial department may establish rules of practice which shall be followed by such department of health in the conduct of said sales in said department.

### RECEIVERSHIP.

Sec. 159. Whenever the lien or liens upon a tenement property, established by judgment, shall amount to one thousand dollars or over, if there be no stay pending appeal, the department of health shall appoint a receiver of the rents and profits

of said property. Said receiver shall give security for the performance of his duties in the manner and form fixed by said department. He shall have the powers and duties of a receiver of rents and profits of real estate appointed by the supreme court; provided that the corporation counsel shall act as his counsel and that he shall not be allowed any expenditure for counsel fees, and provided, that his commissions shall be ten per centum of his collections, which sum shall be full compensation for his services and those of any agent or agents whom he may employ. Said receivership shall continue until the amount of said liens, with interest thereon at the rate of six per centum, and of said commissions, have been fully paid; provided, that nothing in this section shall be construed to prevent any prior lienor from applying to the court in a proper case for a receiver of the property.

### Cancellation of Notice of Pendency of Action.

Sec. 160. If an action to establish a lien upon tenement property terminate otherwise than in a judgment establishing such lien, or if said judgment be fully paid, said notice may be canceled in the manner prescribed by section one thousand six hundred and seventy-four of the code of criminal procedure.

## *REGULATIONS FOR THE CONSTRUCTION OF NEW FIRE-ESCAPES. EFFECTIVE NOVEMBER* 1, 1909.

### BALCONY AND STAIR FIRE ESCAPE TYPE.

#### BALCONIES.

"All fire-escapes shall consist of outside open iron or stone balconies and stairways." "All balconies shall be not less than three feet in width" and "may project into the public highway to a distance not greater than four feet beyond the building line."

Height of railing shall be two feet nine inches.

Landings at head and foot of stairs shall be at least twenty inches by twenty inches.

#### PASSAGEWAY.

"Fourteen inches required between strings of stairs and wall or string of stairs and railings, clear of all projections to a height of six feet six inches.

Twelve inches required between hatchway and window sill.

Fourteen inches required between goose-neck ladder and hatchway on upper balcony.

#### FLOOR SLATS.

One and one-half inches by three-eighths inch wrought iron not more than one and one-quarter inches apart.

Floor slats shall not project more than nine inches beyond bracket and shall not rest on bottom rail.

Floors must be secured to brackets at ends by two three-eighths inch U or clamp bolts or floor slats must extend under bottom return rails.

When floor slats are spliced they must be secured to four-inch by three-eighths inch splice plate by a three-eighths inch bolt or rivet (countersunk or round head) on each side of joint.

Ends of floor slats must not project over stairs so as to overhang the top tread more than the average tread overhangs another tread on a sixty degree stairway.

### Battens.

One and one-half inches by three-eighths inch, not over three feet apart, riveted to slats by five-sixteenths inch rivets.

Battens must not rest on brackets.

### Openings.

"The openings for stairways in all balconies shall be not less than twenty-one by twenty-eight inches, and shall have no covers of any kind."

Openings must be long enough to give at least six feet six inches clear headroom on stairs.

A guardrail of three-quarters inch round iron shall be provided when necessary around hatchway on top balconies and be properly braced at intervals of three feet, and same height as front rail, leaving at least fourteen inches between said rail and strings of goose-neck ladder and wall of building.

Said guard rail shall be braced to front top rail in such manner as to give six feet six inches headroom on stairway. Opening not permitted in floor of lowest balcony. Egress must be from gateway in front or end rail.

### Top Rails.

One and three-quarters inches by one-half inch wrought iron or steel.

One and one-half inches by one-quarter inch angle iron.

Must go through wall when wall is of brick, stone or concrete, and be secured by washers four inches by four inches by three-eighths inch and nut.

Note.—For arrangement as to wooden buildings see below.

Bolt ends must be at least three-quarters inch in diameter.

If bolt ends are separate they must be secured to top rails by two three-eighths inch rivets or two three-eighths inch bolts well upset.

Top rails must be anchored in wall nine inches from window or door opening.

On recess fire-escapes the top rails need not go through the wall, but must be leaded or cemented six inches in brick or stone at least twelve inches from outside face of wall.

Front and return top rails, unless in one piece, must be secured at angle in the following manner with lap joint by one-half inch rivet and tie strap of same dimension as top rail, with one three-eighths rivet in each end of strap. With butt joint by a triangular plate four inches by six inches by three-eighths inch, secured by two three-eighths inch rivets or burred bolts on each side of joint.

Top rails may be spliced with iron of same dimensions as rails with two three-eighths inch rivets or bolts well burred on each side of splice, or may be overlapped and secured by two three-eighths inch bolts of rivets.

Where front rails are more than ten feet long, they must be braced with one outside brace in every ten feet or fraction thereof of running length. Said braces must be three-quarters inch wrought iron properly spaced and must be secured by two three-eighths inch rivets or bolts to the extended brackets and by one three-eighths inch rivet or bolt to top rail.

Up to eleven feet the rail may be accepted without additional bracing if well secured to stairs.

Bow braces and overhead braces will not be accepted.

## Bottom Rails.

One and one-half inch by three-eighths inch wrought iron or one and one-half inch by one-quarter inch angle iron.

Must be leaded or cemented in walls when of brick.

Must be secured by lugs to brackets by three-eighths inch rivets or bolts, well burred.

Must be connected at angles by at least one three-eighths inch rivet or bolt, well burred.

Must be spliced as in case of top rails.

### Standards.

May not be less than one-half inch round or square, set vertically, riveted to top and bottom rails, not more than six inches apart on centers. Special design must be submitted for any variation and approved before work is begun.

### Landing Platform Required When Lowest Balcony Is Over Sixteen Feet Above Ground Level.

Shall not be less than three feet by three feet of available landing space.

Shall not be more than ten feet above the ground.

Construction shall be the same as for balconies, with either an end or front rail where necessary.

Stairway connections must be provided with balconies above, as per regulations.

(Raised iron grating will not be permitted except over areaways.

### Stairways.

All stairways shall be placed at an angle of not more than sixty degrees, with flat open steps not less than six inches in width and twenty inches in length and with a rise of not more than nine inches.

Flat iron bars forming treads must be one and one-half inches by one-quarter inch, not more than three-quarters of an inch apart.

They must be secured to strings by angle iron one and one-half inches by one-quarter inch, secured by two five-sixeeenths inch bolts, burred, and clats secured to angle irons by one-quarter inch rivet at each end.

All treads must be set level and must not overhang so as to interfere with foot room on tread below.

Caution: Cast iron treads will not be accepted.

### Strings.

Must be of bar iron three-eighths inch by four inches, and shall rest upon bracket at bottom, and in all cases be bolted to brackets at top.

Strings must be braced by three-quarters inch round bars, properly leaded or secured by four inches by three-eighths inch expansion bolts in brick or stone wall at height of not less than six feet six inches in the clear above floor of balcony.

### Hand Rails.

Wrought iron, three-quarters inch round by one and one-half inches by three-eighths bar, well braced with intermediate braces not over five feet apart, and of the same size and maetrial of hand rail, and secured to strings with two three-eighth inch rivets at each end and at each brace; or

Hand rails may be secured to bottom rail of upper balcony and top rail of lower balcony by two three-eighths inch rivets at each end.

Double hand rails must be provided when balconies are not directly over each other.

### Brackets and Braces.

Brackets must be in one piece, one-half inch by one and three-quarters inches wrought iron, set edgewise not over four feet apart.

Should be placed not less than eight inches, nor more than sixteen inches below window sill, except by special permission from department.

Must be braced with three-quarters inch square braces, secured to bracket by one three-eighths inch rivet at a point two-thirds of length of bracket from wall. The brace when entering wall must

be leaded or cemented in brick or stone and have a proper bearing on face of wall.

When the bracket brace has a knee or heel, said heel must bear directly against the wall.

If wedges are used to obtain full bearings against the wall, they must be of iron and well secured to the brace.

Anchorage in or bracing with open braces in terra cotta not accepted.

Braces must drop at least one-third of the length of bracket, and at short brackets not less than eight inches.

Where a bracket is to receive additional weight on account of suspension rods for lower balconies, said brackets must be reinforced by an additional three-quarters inch square brace, running from end to end of bracket parallel to regulation brace, or over one inch square brace to outer end of bracket.

Caution: Angle iron brackets not permitted, unless by special permission based upon needs arising from very unusual conditions, and the need of such construction as a means of meeting the difficulties presented by such conditions. In all such cases designs shall be submitted and work shall not commence until same have been approved.

Where it is impossible to brace the brackets in the manner described above, it will be necessary to use angle iron and tire rod supports.

Brackets on new buildings must be built in wall and must be turned down three inches, or anchorage will be accepted with bolt ends one inch in diameter, washers four inches by six inches bv three-eighths inch and nuts; at panel backs, or where wall has been reduced from original section, or terra cotta sills, the brackets must be bolted through agle iron or channels four inches by three-eighths inch, running from pier to pier inside of building and bearing six inches on each pier, except by special modification.

Special design to be submitted for framing bracket around terra cotta molding, panels, etc.

Specifications and plans must be submitted for channel and T iron construction in recess fire-escapes; also for offset brackets.

## Drop Ladder.

"A drop ladder shall be provided from the lowest balcony of sufficient length to reach to a safe landing place beneath."

Landing platform required when lowest balcony is over sixteen feet above ground.

Length of drop ladder must not exceed distance from lowest platform to safe landing by more than six inches.

Strings, to be one and one-half inches by three-eighths inch bar one and one-half inches by one-quarter inch iron—one piece.

Width of ladder, fifteen inches over all.

Rungs five-eighths inch, not over twelve inches apart and riveted to strings.

Drop ladders for new fire-escapes must be suspended from some point immediately over opening in rail of balcony, and arranged to slide on guides so as to drop into position for use.

Angle iron drop ladder shall be constructed as follows:

The strings shall be constructed of not less than one and one-half inches by one and one-half inches angle iron one-quarter inch thick. The effective width of the ladder (length of rungs) to be not less than 12 inches, rungs not less than five-eighths inch round iron rod or iron pipe, of the same size known as one-half inch standard pipe. Pipe rungs may be used throughout, if desired, except for the center and two end rungs, which shall be constructed of five-eighths inch round iron bar, shouldered at each end, the shouldered end of such bar or rung being not less than three-eighths inch in least dimension and sufficiently long to admit of the proper riveting of the same through the strings. The pipe rungs shall be expanded at the ends or otherwise properly secured to the strings, to the satisfaction of the Tenement House Department.

## Egress from Lowest Balcony.

Gateway in front rail must be at least two feet and not more than three feet wide in the clear

Opening in end rail not permitted in front of the lowest step, unless landing is three feet by three feet at foot of stairs.

Top rails at gateway must be well braced.

### Goose-Neck Ladder.

"The balcony on the top floor, except in the case of a balcony on the street, shall be provided with a stairs or with a goose-neck ladder leading from said balcony to and above the roof and properly fastened thereto.

Goose-neck ladder must be two inches by one-half inch wrought iron, fifteen inches wide, with rungs five-eighths inch and not more than twelve inches apart at centers.

Strings must be bolted at the bottom to a two inches by one-half inch flat bar, which is riveted to floor slat and extends across two brackets. (Note.—Floor slats must be secured to these brackets with three-eighths inch U or clamp bolts.)

Must extend two feet six inches above parapet wall, or above roof, if there is not parapet wall.

Must spread at parapet wall to give passageway of eighteen inches.

Must be well braced.

Must be tied to wall by braces going through parapet wall immediately above roof, or, in absence of parapet wall, to be tied to wall immediately below ceiling of room by three-quarters inch bolt and four inches by four inches by three-eighths inch washers.

Goose-neck ladder must be secured and braced at roof.

Goose-neck ladder must be at least eighteen inches from rail, except when it slants toward the roof, when fourteen inches clearance at top rail will be accepted.

### Encumbrance Plates.

Encumbrance plates required at all balconies in front of each apartment, facing window of apartment with one-half inch letters, raised and prominent.

Letters to be painted a different color from body of plate. "Anyone placing any incumbrance on this balcony will be fined ten dollars."

### Painting.

"All fire-escapes," if of iron, shal receive not less than two coats of good paint, one in the shop and one after erection.

## FIRE-ESCAPES ON WOODEN BUILDINGS.

### All Brackets.

One and three-quarters inches by one-half inch wrought iron edge; one inch bolt end through a four inches by three-eighths inch plate, long enough to take in all brackets, secured to and bearing directly on studs.

Heel of bracket braces to rest against one and three-quarters inches by one-quarter inch angle iron extended across and well secured to studs or inertie.

### Top Rails.

Shall be anchored as above described for brackets.

### Bottom Rails.

Shall be secured in a substantial manner to siding with two one and one-quarter inches No. 14 wood screws.

### Stairways.

Stair braces shall be secured to one and one-half inches by one-quarter inch angle iron, extending across two studs, and secured to same (studs) by four inches by three-eighths inch lag screws. Spreader braces, properly secured, may be used by special modification.

All fire-escapes must be constructed as heretofore stated in detail, or as per specifications made for wooden houses, or as per approved sketch.

## IRON, STEEL OR WIRE CABLE FIRE-ESCAPES.

"Tenement houses that are less than four stories in height and which also do not contain accommodations for more than four families in all, may be equipped with such iron, steel, or wire cable fire-escapes as may be approved by the department charged with the enforcement of this chapter.* Such escapes must be capable of sustaining two thousand pounds, and be of sufficient length to reach from the top floor to the ground, and with rungs not more than twelve inches apart and not less than fifteen inches in length," and must be well secured on inside of building to floor and base in such a manner as will stand the above test.

Cable fire-escapes must not be located directly over each other, and if located at windows over porches, etc., must be long enough to clear the roof or porch and reach to the ground.

Cable fire-escapes must be subjected to a satisfactory test in the presence of an inspector from this department.

## VERTICAL LADDER FIRE-ESCAPE TYPE.

### Location.

Vertical ladder shall be directly accessible to a window of each apartment above the ground floor.

### Strength.

"All fire-escapes shall be constructed and erected to safely sustain in all their parts a safe load."

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*Tenement House Department.

The platforms or balconies shall be constructed and erected to safely sustain in all their parts a safe load, at a ratio of four to one, or not less than eighty pounds per square foot of surface.

### Good Order and General Repair.

"The owner of every tenement house shall keep all the fire-escapes thereon in good order and repair, and whenever rusty shall have them properly painted with two coats of good paint. No person shall at any time place any incumbrance of any kind before or upon any such fire-escape."

EDMOND J. BUTLER, Commissioner.

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